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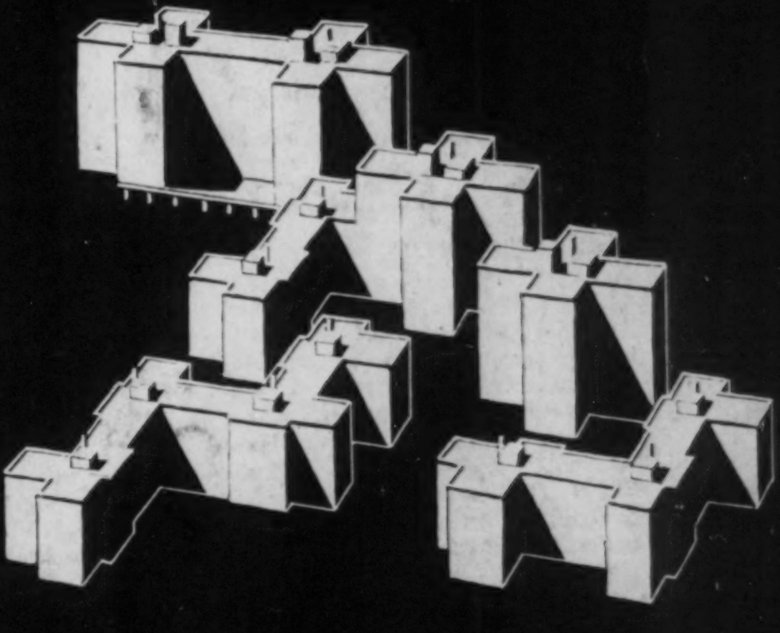
ARCHITECTURAL RECORD



LOW-RENT APARTMENTS • JANUARY 1946

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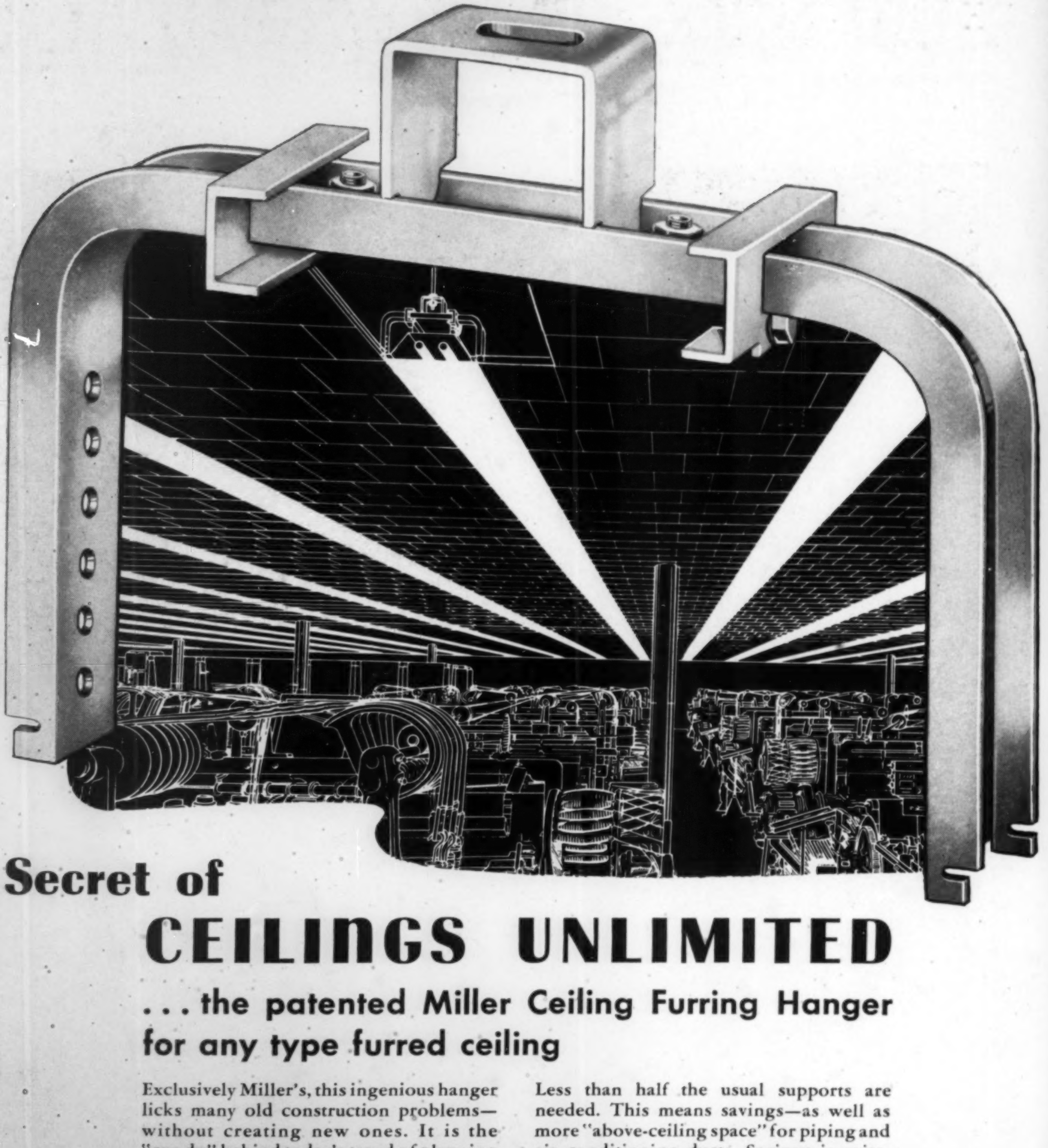

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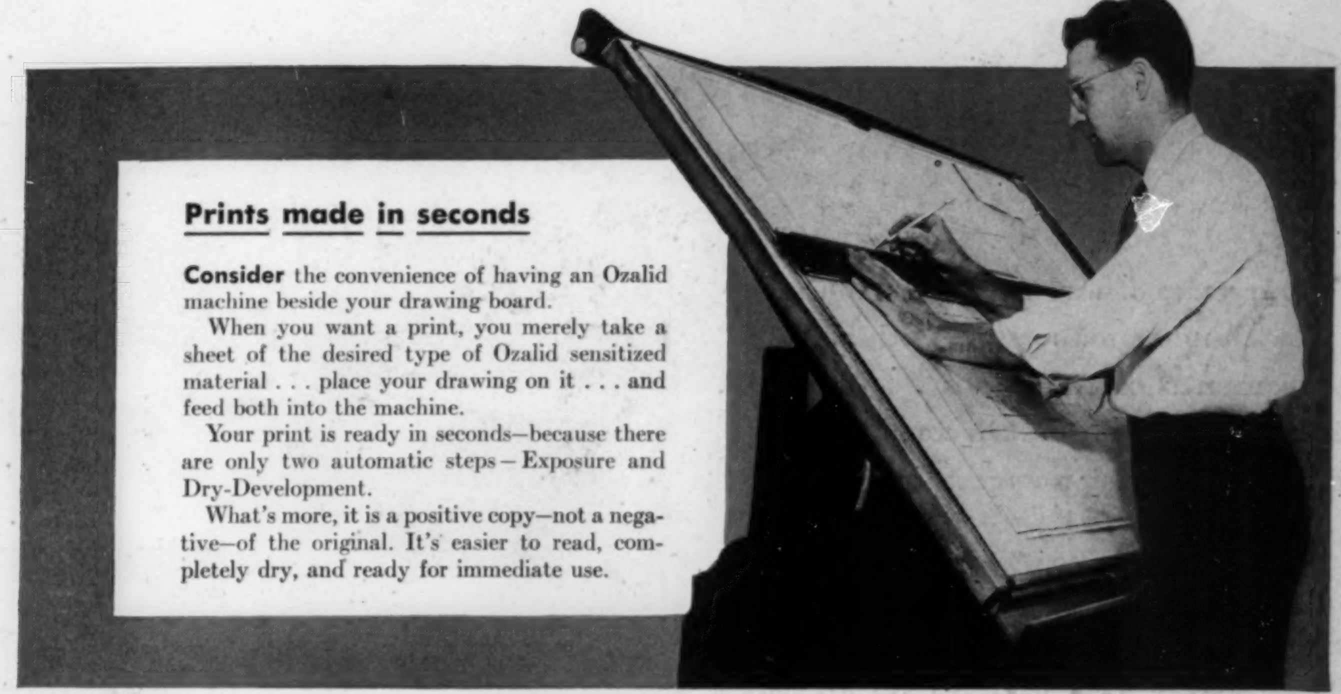

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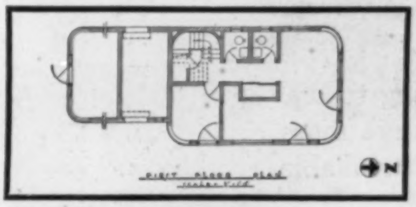

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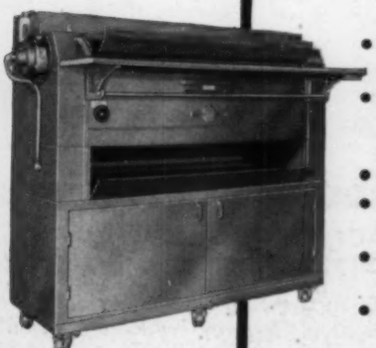

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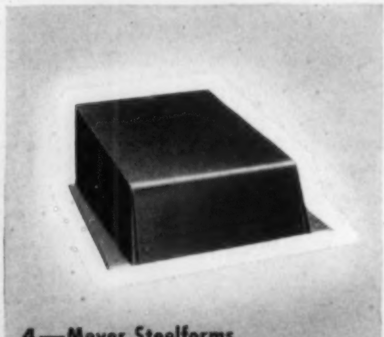

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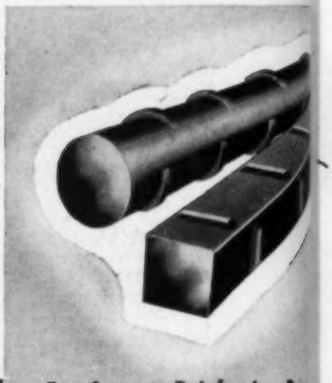

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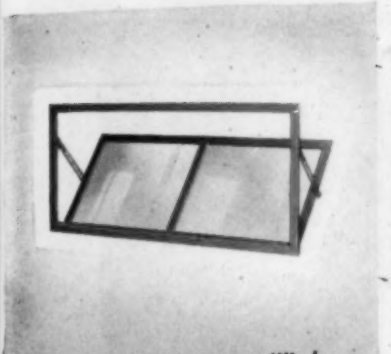
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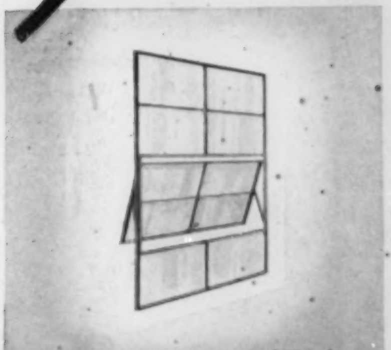
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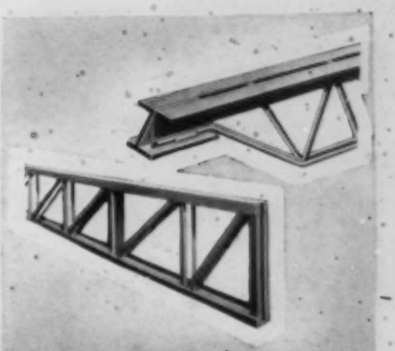
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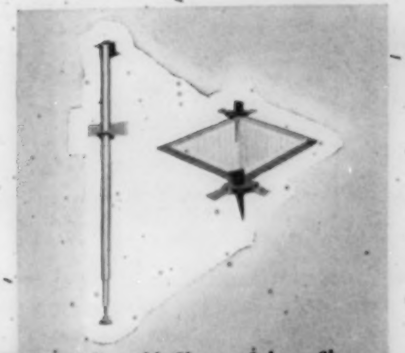
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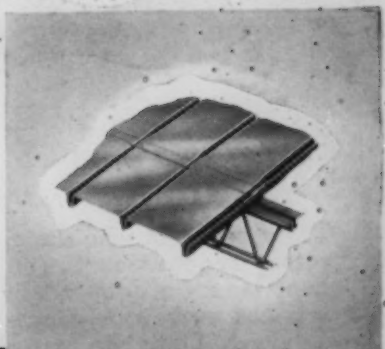
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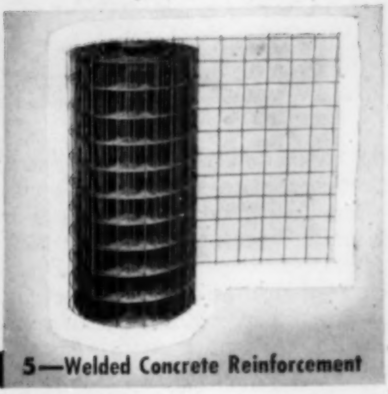
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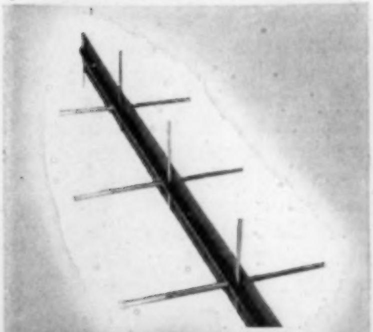
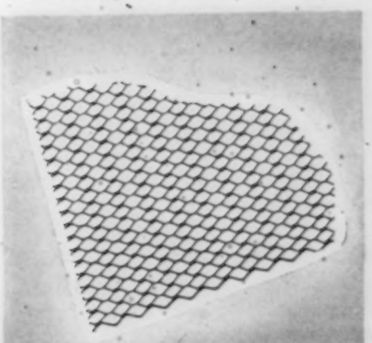

8—Highway Center Strip,
Dowel Bars and Stake Pins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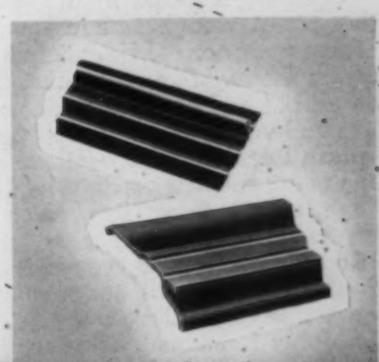
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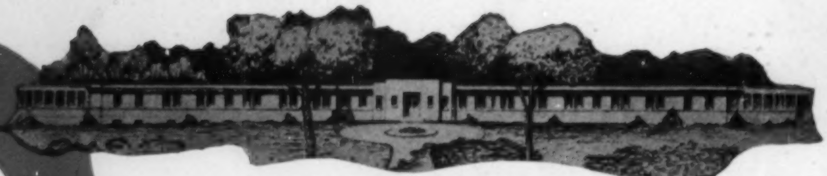

CHRONIC PATIENT HOSPITAL—Montgomery County, Ohio
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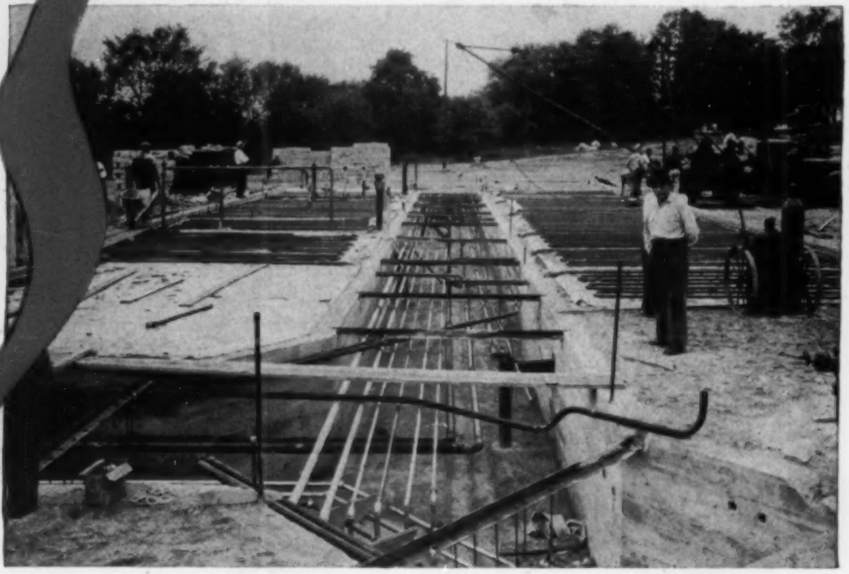

Every architect who designs hospitals recognizes the supreme importance of dependability in services and in equipment, for failures not only are hard on budgets, but may affect the welfare of patients.

In the Montgomery County Infirmary Hospital at Dayton, Ohio, one phase of the emphasis on dependability is shown by the extensive use of wrought iron in services where corrosion can be anticipated. Byers Wrought Iron was installed in all hot and cold water lines; in the underground steam supply and return lines from the central heating plant; and in the radiant heating floor coils. Over five miles of Byers Wrought Iron pipe were used for the heating system alone.

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ARCHITECTURAL VOL. 99 • NO. 1 **JANUARY • 1946**

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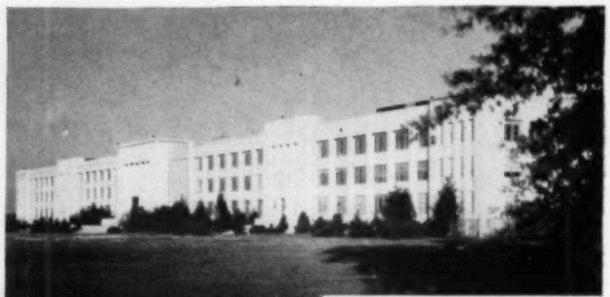
Selecting FLUSH VALVES FOR INDUSTRIAL PLANTS . . . . . .



Several interesting trends in flush valve applications for industrial plants are disclosed by a recent survey among architects widely experienced in industrial plant design.

For example, while hand-operated flush valves continue to have top preference for closet bowls and urinals, there is a growing trend toward the use of foot-operated flush valves for both of these applications. This trend and others are discussed in the booklet offered below.

Of course, a primary consideration in the selection of any flush valve combination is dependable, trouble-free performance, characteristic of all Watrous Flush Valves.

Very important also is economy—here the simple Watrous Water-Saver adjustment makes possible savings of many thousands of gallons of water each year.

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ARCHITECTS' VIEWS ON FLUSH VALVE APPLICATIONS

A survey of interesting trends in the selection of flush valves for industrial plants is given in Bulletin No. 477. Write for your copy. For full information on Watrous Flush Valves see Sweet's Catalog or ask for Catalog No. 448-A.

Watrous Flush Valves

THE RECORD REPORTS

Wagner-Ellender-Taft Housing Bill Takes the Washington Spotlight • Truman Urges Hospital Construction Program FHA Plans to Insure Mortgages for Builder-Operators

WHILE the low temperatures and high costs hold back construction activity over the top half of the nation, the slow mills of government grind away steadily in Washington, D. C., trying to iron out reconversion and the postwar tangles on housing. Congress tackles the comprehensive Housing Bill (S. 1592) sponsored by Senators Wagner, Ellender and Taft. Remaining war agencies keep adjusting their inventory, price and other controls as industry approaches a peacetime economy. Permanent government units, including those for housing, hold weather eyes not only on the momentary transition but also on the long-time postwar prospect.

Fight on Housing Bill

Shortly after Thanksgiving the housing spotlight fell on the Wagner-Ellender-Taft Bill, a re-draft of the measure introduced some months ago. Hearings got under way before the Senate Banking and Currency Committee, which Senator Wagner heads. The plan was to have the hearings complete and prolonged. Plenty of pros and cons were anticipated.

The broad nature of the measure, in a sense, invited attack as well as support. Even one of its sponsors, Senator Taft, pointed out:

"In a bill of this length there are bound to be many details with which I do not agree, and some to which the other two Senators do not agree. We propose to hold extensive hearings, as a result of which the bill may be modified."

Importance of the legislation is pinpointed by Senator Ellender, who says: "I regard the housing problem as perhaps our most important single postwar economic and social issue."

Reseach Included

In an analysis of the bill, Senator Wagner explained that, under 11 titles, it "deals with the preliminary and underlying phases of technical research, market analysis, and periodic housing inventories. . . . It provides for the varied needs of our urban and rural areas alike, and for those of moderate and low income, as well as for those higher in the income scale." For one thing, it provides a unified national housing agency. Low-rent public housing is included in its scope, and rural housing.

What else would it do? Here's a quick look:

Insurance Broadened

It arranges FHA supplemental mortgage insurance for home owners of lower income by a combination of 95 per cent loan, 32-year maturity, and a maximum 4 per cent interest rate (for mortgages not exceeding $5,000).

It provides a special program of yield insurance by FHA to encourage direct investment in rental housing: it guarantees a minimum return of 2¾ per cent per annum.

Significantly, it authorizes aid to local communities for slum clearance, etc., and for low-rent housing. Such aid also could go to make studies of local housing needs.

It calls for federal contributions for rural housing at an estimated rate of 38,000 dwellings a year or 190,000 in five years.

It lets Federal Savings and Loan Associations

1. Take part in the FHA insurance program without restriction;
2. Take part also in the federal home-loan guarantee for veterans;
3. Take part in the yield-insurance program for direct investment in rental housing otherwise provided in the bill.

Similarly, it removes restrictions on Federal Home Loan Bank participation in the FHA insurance and Veterans' Administration guarantee programs.

Among other things, it reduces the premium for Federal Savings and Loan Insurance Corporation insurance from one-eighth to one-twelfth of one per cent.

Demand Estimated

Pertinent word on the housing picture crept into the Senate hearings on the bill. To quote NHA Chief Blandford: "Estimates of the pressure of the housing demand between October 1, 1945 and December 31, 1946, come to about 4,660,000 units. . . . Outside estimates of the supply that is or will be available to meet this demand during the same period, through existing vacancies, new vacancies, and new construction add up to 1,420,000 units." This leaves a shortage of some 3,240,000 units.

The NHA chief makes plain also that the bill "seeks to provide protection to the small home owner against defects in construction, faulty materials or workmanship, and violations by the building contractor of his contract obligations, by requiring warranty by the principal contractor against such defects or breach of contract."

State colleges and universities wishing to provide housing for veterans, Mr. Blandford explains, would, under the bill, be eligible for 95 per cent insurance, and privately-endowed educational institutions would be eligible for 90 per cent insurance.

Public Housing Programmed

Testimony by FPHA Commissioner Philip M. Klutznick on the public housing features of the legislation brings to light that applications for

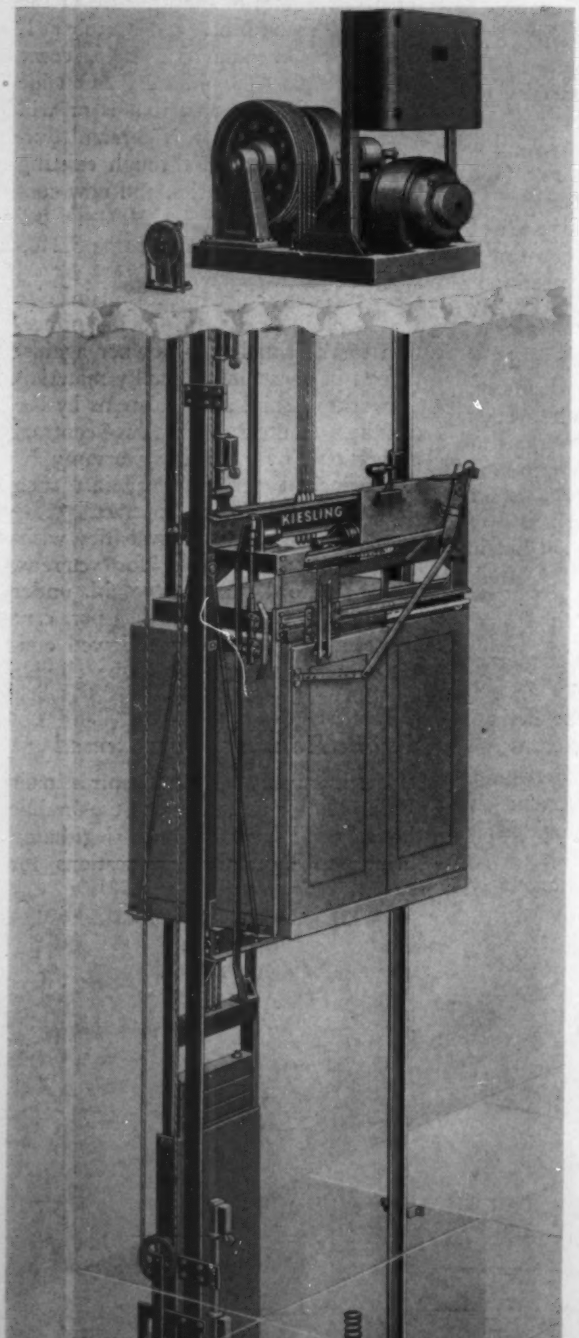
(Continued on page 10)

Well, I finally got my attic . . ."

—Drawn for the RECORD by Alan Dunn

KIESLING

PASSENGER AND FREIGHT ELEVATORS



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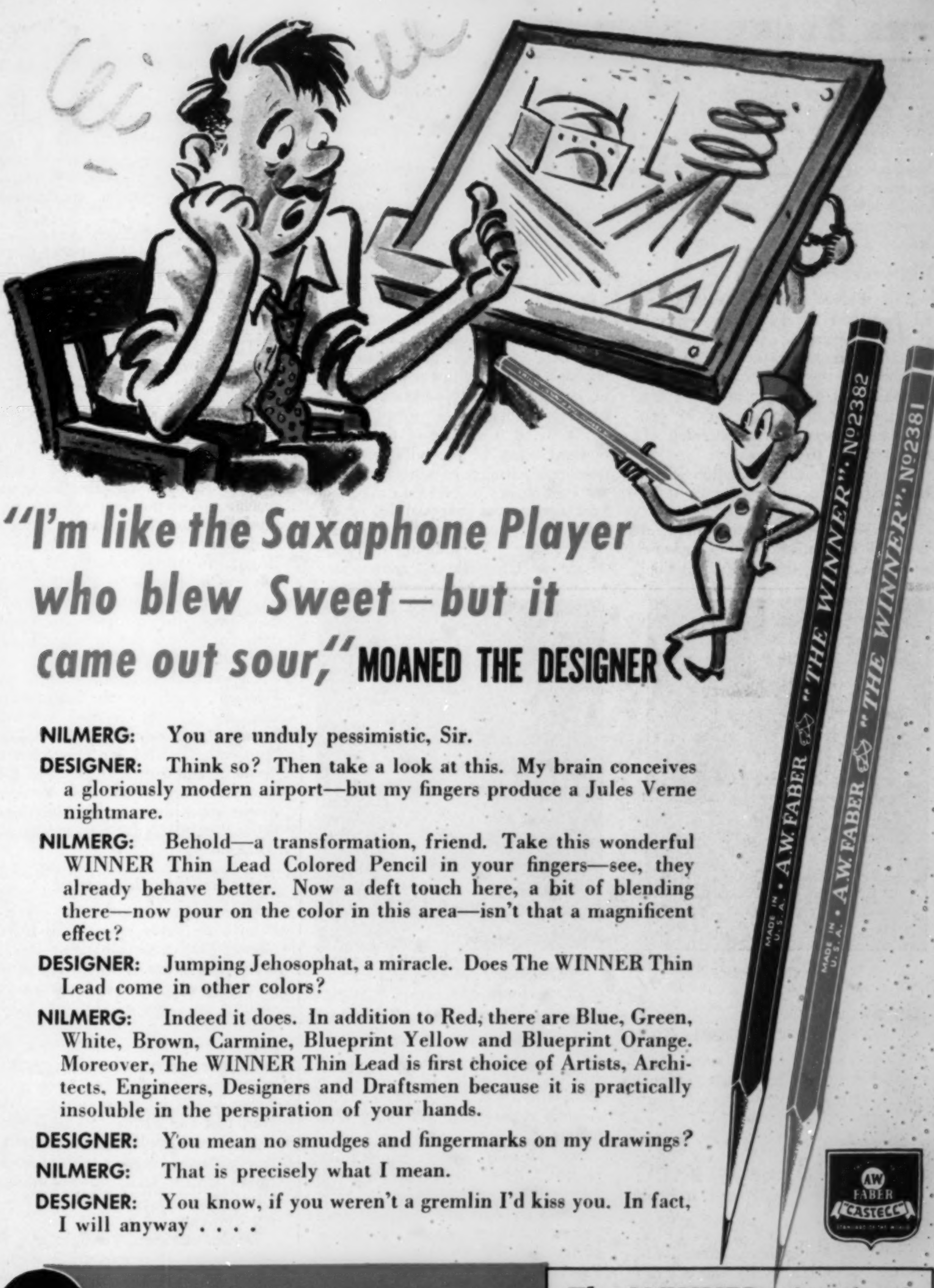
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DESIGNER: Think so? Then take a look at this. My brain conceives a gloriously modern airport—but my fingers produce a Jules Verne nightmare.

NILMERG: Behold—a transformation, friend. Take this wonderful WINNER Thin Lead Colored Pencil in your fingers—see, they already behave better. Now a deft touch here, a bit of blending there—now pour on the color in this area—isn't that a magnificent effect?

DESIGNER: Jumping Jehosophat, a miracle. Does The WINNER Thin Lead come in other colors?

NILMERG: Indeed it does. In addition to Red, there are Blue, Green, White, Brown, Carmine, Blueprint Yellow and Blueprint Orange. Moreover, The WINNER Thin Lead is first choice of Artists, Architects, Engineers, Designers and Draftsmen because it is practically insoluble in the perspiration of your hands.

DESIGNER: You mean no smudges and fingermarks on my drawings?

NILMERG: That is precisely what I mean.

DESIGNER: You know, if you weren't a gremlin I'd kiss you. In fact, I will anyway . . . .

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nearly 500,000 units of public housing as a three-year program already have been filed with FPHA by cities and rural areas—355,599 units by urban localities and 141,473 units by rural counties. Under the bill about 125,000 public housing units a year would be possible, or a total of 500,000 in four years.

Bill Is Criticized

From Federal Housing Administrator Raymond M. Foley came support of the bill generally, but criticism of the 32-year maturity proposal in connection with the 95 per cent insurance of mortgages. While he approved the insuring of mortgages up to 95 per cent, he questioned the extension of time from 25 to 32 years.

Criticism of the legislation came from other quarters, including trade groups.

The National Association of Real Estate Boards struck at the measure variously, stating that it is a long-time proposal and not designed to meet the present housing shortage, that it would insure federal domination of municipalities, that the builders' warranty would force the federal government to umpire small disputes, that the yield insurance is impractical, and that the housing agencies should not be kept under a central unit such as NHA.

Cumulative effect of the bill would be damaging, maintained the National Association of Home Builders. They said it would stop private lending in the rural field, and told the Committee: "We believe that it is unfortunate and improper to include in one bill 11 drastic changes in the production and financing of housing."

The U. S. Chamber of Commerce opposed many of the bill's terms. It questioned changes in mortgage credit, the continuance of NHA as a permanent agency, the proposed federal expenditures at a time when private industry "will be straining every resource to take care of accumulated housing and other building requirements," the making of housing a social goal, and the reduction of interest rates.

The American Bankers Association held that the bill is too comprehensive and should be broken up into several measures; they pointed out that it does not touch labor and material shortages which are the present construction bottlenecks.

The Mortgage Bankers Association, opposing most features, made particular point against the public housing provisions.

The Producers' Council contended that the public housing features of the legislation should be considered purely as a local problem rather than on a national level. They expressed opposition to making NHA permanent.

Hospital Program Urged

Less conspicuous from the standpoint of headlines but nevertheless important to the building industry was another matter before the Congress. Buried in a message of President Truman to the Congress in the weeks before Christmas—his so-called message on health—came a recommendation, amplifying his previous suggestions, for construction of hospitals and related facilities.

The federal government, said the President, should provide financial and other aid to build needed hospitals, health centers, etc. He urged facilities "particularly useful for prevention of diseases," and expressed the belief that the federal arm should lay down, in connection with its funds, "minimum national standards for construction and operation."

Price Ceilings Demanded

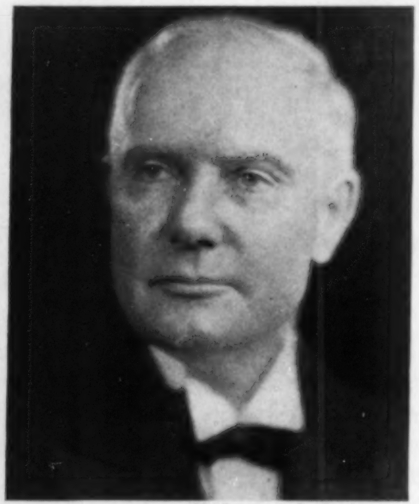
Meanwhile Congressman Wright Patman of Texas joined with OPA's Chester Bowles in demanding ceilings on housing prices. To assist this move, he introduced in the House a bill creating an Office of Housing Stabilization with a director empowered to put price ceilings on both new and old homes, to give housing priorities to veterans, and take other steps. There wasn't much indication, however, that the Patman proposal could be hurried into law, although it got Administration support with testimony from NHA's Chief Blandford and OPA's Bowles before the House Banking Committee.

Bowles continued his fight, too, for maintenance of rent controls without relaxation, new construction included.

On the other hand OPA adjusted some of its ceiling prices on building items. It pushed upward the ceilings on Southern pine lumber at the mill

(Continued on page 12)

L. Andrew Reinhard, A.I.A.



Underwood & Underwood

Frederick V. Murphy, F.A.I.A.

APPOINTED TO FINE ARTS COMMISSION

Recently honored by President Truman with appointment to the National Commission of Fine Arts are three architects and a sculptor: William T. Aldrich, F.A.I.A., of Boston; L. Andrew Reinhard, A.I.A., New York; Frederick Vernon Murphy, F.A.I.A., Washington; and Lee Lawrie, sculptor, Easton, Md.

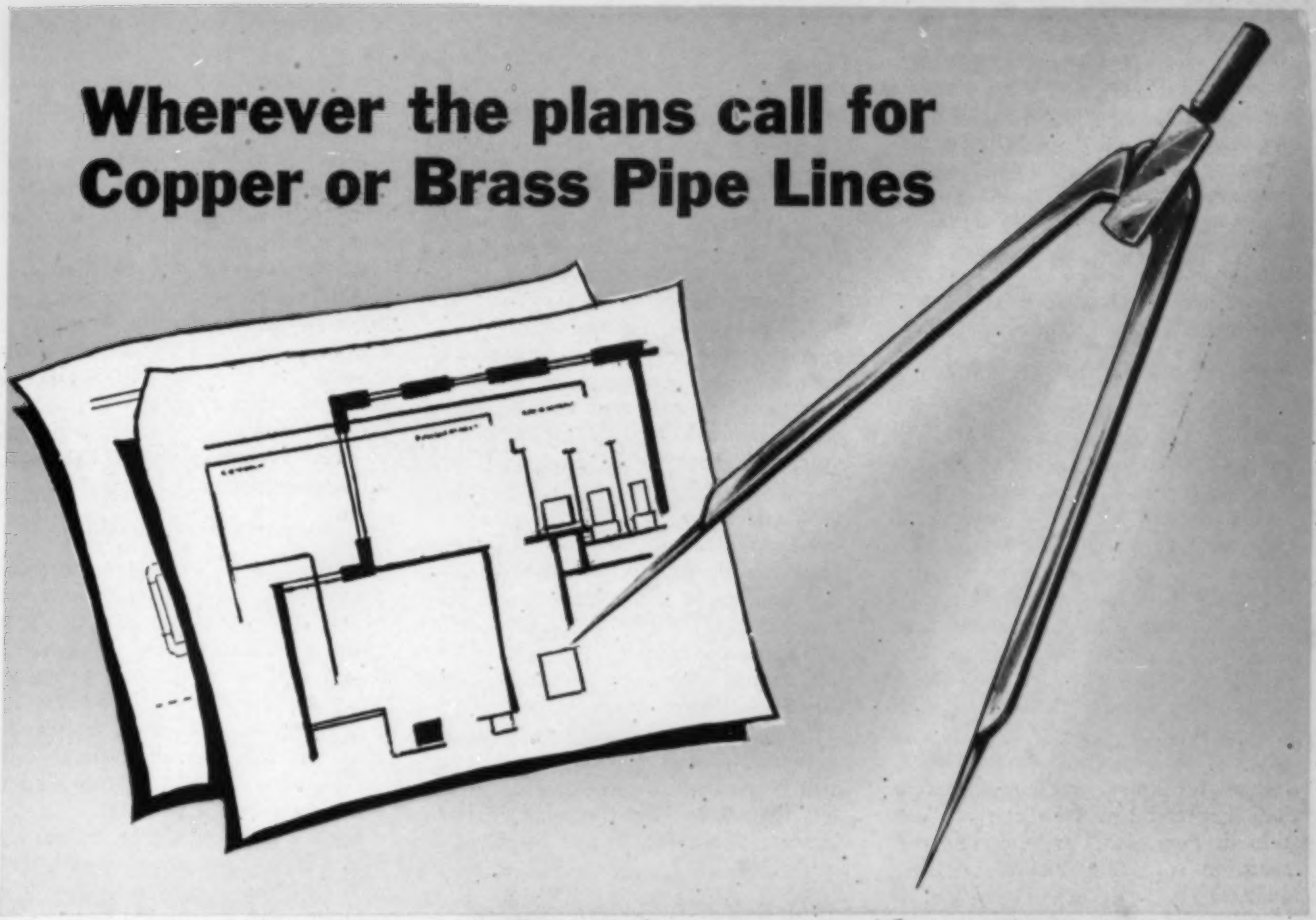
Mr. Aldrich, a graduate of M.I.T. and the Ecole des Beaux Arts, Paris, includes among his work the Worcester (Mass.) Art Museum, the Museum of the Rhode Island School of Design and Benedict Monument to Music, both in Providence.

Mr. Reinhard is a member of the New York firm of Reinhard & Hofmeister, architects for Rockefeller Center, awarded the Gold Medal of the Architectural League of New York in 1937, the Gold Medal of the Fifth Avenue Association, and many other honors.

Mr. Murphy is the founder and present head of the School of Architecture, Catholic University of America, and architect of a number of important buildings including the Shrine of the Sacred Heart Church and the Papal Legation, Washington.

Mr. Lawrie, nationally known sculptor, is a member of the American Academy of Arts and Letters, and the committee on sculpture for the Hall of Fame.

Wherever the plans call for Copper or Brass Pipe Lines



SPECIFY *Silbraz** *Joints*

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ECONOMICAL INSURANCE OF CLIENT SATISFACTION

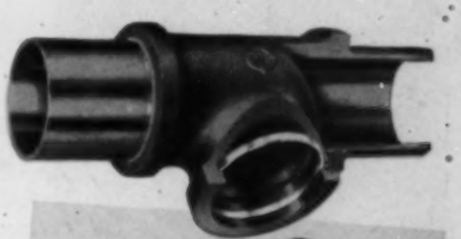
The Silbraz joint – the modern threadless joint for copper and brass pipe or tubing – actually bonds pipe and fitting into a single, "one-piece" unit.

An insert of silver brazing alloy incorporated in the fitting melts under the heat of an oxyacetylene torch and flows out between pipe and fitting to produce a permanent, leakproof bond. The completed joint is easily identified by a fillet of silver brazing alloy which appears at the end of the fitting where the pipe fits into it.

Silbraz joints withstand the severest vibration and shock — even the kind of abuse encountered in diesel locomotives, tanks, and fighting ships on which they are widely and successfully used.

Fittings and valves for making Silbraz joints are produced by leading manufacturers. You can specify them with assurance for all types of buildings – for plumbing and heating lines, fuel, gas and process lines – wherever you want brass or copper pipe lines that can "take it" and give your clients full satisfaction.

* Reg. U. S. Pat: Off.



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THE RECORD REPORTS

(Continued from page 10)

level by 4.7 per cent; it allowed an increase of 10 per cent in the maximum prices for low-priced builders' hardware items used in building and repairing homes, including hooks, brackets, knobs, door springs, etc.; it sanctioned a boost of $3 per 1,000 sq. ft. in manufacturers' prices for gypsum lath and liner board; it revised the special item pricing provisions of the hardwood plywood regulation.

Commerce Predicts for 1946

As the old year drew to a close, the new Construction Division of the Department of Commerce, with a fund of data for a crystal ball, looked into the future and saw for 1946 a "fairly good construction year." Americans, it found, will spend nearly three times as much for building new homes as in the last war year, and private industry will hit an all-time high of $5.2 billion in construction. Over $12 billion will be spent in the building field during the year, $7.3 billion for construction, public and private, and $5 billion for repair and maintenance. The key trend will be one of "continuous expansion," with private construction surpassing all records since 1929.

Aside from industry, says the CD, sharp advances will probably also be registered in other non-residential building such as hotels, stores, warehouses and theaters. Fittingly enough, military, naval and publicly-financed industrial construction is expected to fall to one-sixth of its $1.2 billion total for 1945.

NHA Looks at Next Decade

In its long look ahead—for the next decade—the National Housing Agency points up a variety of data. By 1955, it assumes, there will be roughly 36,795,000 non-farm families in this country, of which about a fourth will have incomes of less than $1,000 a year, about 15 per cent will have incomes between $1,000 and $1,500 a year, and about 60 per cent will have incomes above $1,500. On this basis it figures that housing for about 9,000,000 families should be available at less than $20 per month, for about 6,000,000 families at less than $30, and for more than 21,000,000 families at $30 and more per month.

Carrying its figures further, the Agency anticipates that of the 12,600,000 units of new construction required over the 10-year period, 28 per cent will be needed at monthly charges of less than $20; 38 per cent at charges between $20 and $40; and 34 per cent at monthly charges above $40.

Rental Mortgages Planned

Among new incentives for the rental of new houses is a plan for the Federal Housing Administration to insure mortgages for builder-operators. Under the plan, FHA will look over the builders' plans and agree to insure 80 per cent of the value up to $6,000, 60 per cent from $6,000 to $10,000. The thought is that this will move builders to rent the homes, induce banks to ease terms on construction loans, and, if the house is finally sold, save money for the buyer in that details such as title search, inspection, etc., will have been cared for.

Another move of the FHA is notification to banks that it will insure mortgages on homes on the outskirts of suburbs. Spreading out of home construction in this way, it is expected, will have effects in the course of a decade, expanding market areas and possibly even calling for additional utilities ultimately.

Advisory Services Possible

As to controls over prices at which houses are sold, the NHA may seek funds to finance cities that set up advisory services on home values. The idea would be for mayors to appoint committees to keep tab on the real estate market. However, before any plan was put into effect the housing industry itself would be consulted on measures for "self-policing."

Such a move would be in line with the proposal by some government officials for "community drives" to serve as a substitute for federal wartime controls. The goal would be for such community action to take over jobs as the federal government abandons them, including the pushing of housing construction, the handling of veterans' problems, market planning, etc. Close consultation between government bureaus and trade associations would be one feature of such a trend.

In connection with the Committee on Construction within the Office of War Mobilization and Reconversion, Reconversion Director John W. Snyder announced, upon the resignation of Hugh Potter as Construction Coordinator, that the Committee would function through another OWMR office, with Alvin I. Brown, Washington, D. C., construction engineer, directly in charge.

Federal Works Agency

Deputy Commissioner Jesse E. Stanton

STANTON REPLACES HOWE

George Howe, Deputy Commissioner for Design and Construction, Public Buildings Administration, has resigned because of ill health. His successor will be Jesse E. Stanton, at present Division Engineer of PBA's Division Office in San Francisco.

Mr. Stanton, a native of San Francisco, formerly was associated with D. H. Burnham & Co. on the Chicago Beautiful plans, and with the New York firm of Warren & Wetmore on hotel construction. He had charge of designing schools and firehouses after the San Francisco earthquake and fire. He joined PBA in 1941 as consulting architect on the program to expedite the construction of war housing, and in July, 1945, was appointed executive head of the San Francisco office.

George Howe

Federal Works Agency

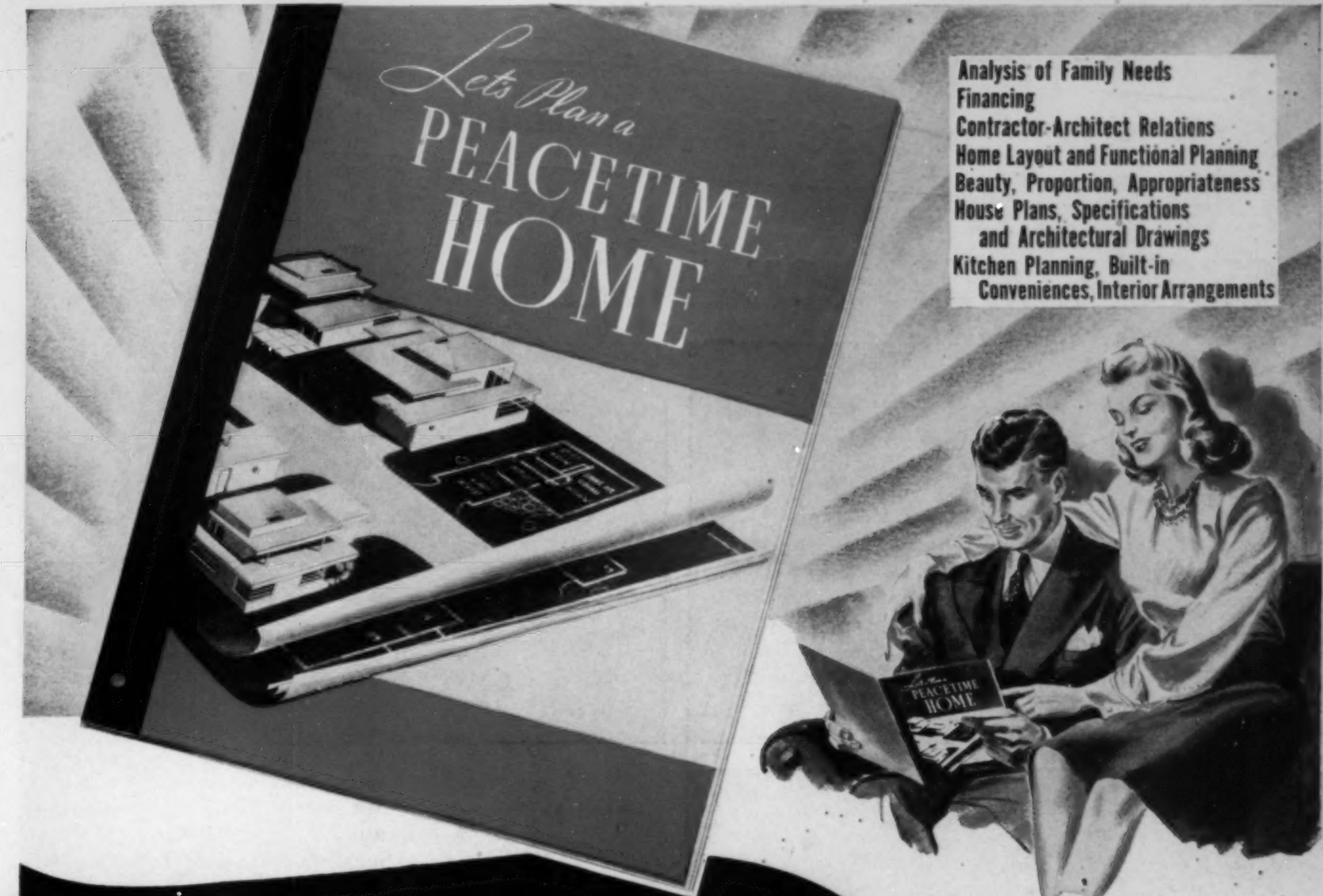
◆ ◆ ◆

GOVERNMENT NEEDS ENGINEERING DRAFTSMEN

The Civil Service Commission is conducting a recruiting campaign to secure engineering draftsmen for work in various government agencies in Washington, D. C. Entrance salaries range from $1,704 to $2,980 a year.

Application forms, and a copy of examination announcement No. 406 which contains full information re-

(Continued on page 106)



Analysis of Family Needs
Financing
Contractor-Architect Relations
Home Layout and Functional Planning
Beauty, Proportion, Appropriateness
House Plans, Specifications
and Architectural Drawings
Kitchen Planning, Built-in
Conveniences, Interior Arrangements

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We're distributing this book nationally at $1.00 a copy. We believe it's the biggest planning book value offered today. Send your check or a dollar bill for your copy now. After reading it, you'll probably want to order additional copies for use with your prospects. Write Dept. AR, Surface Combustion Corp., Toledo 1, Ohio.

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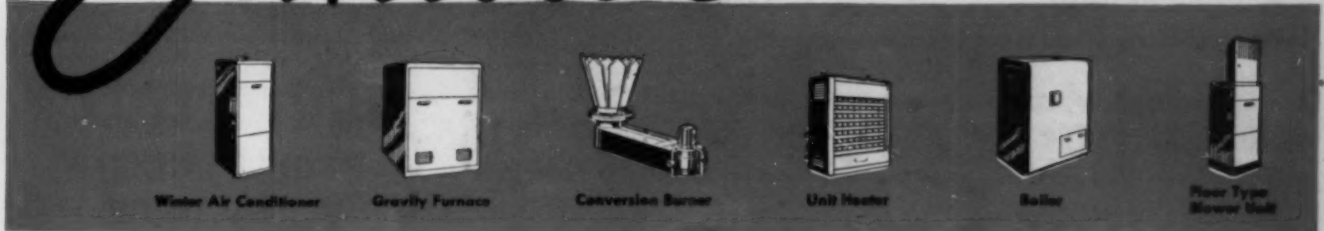

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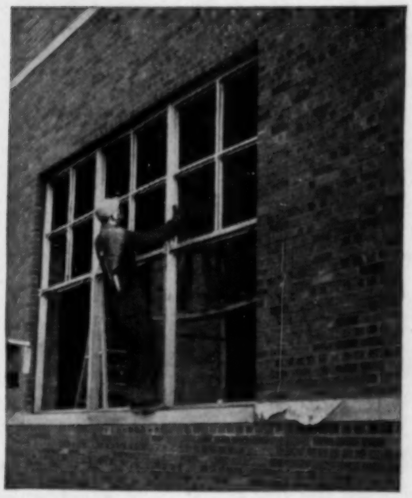

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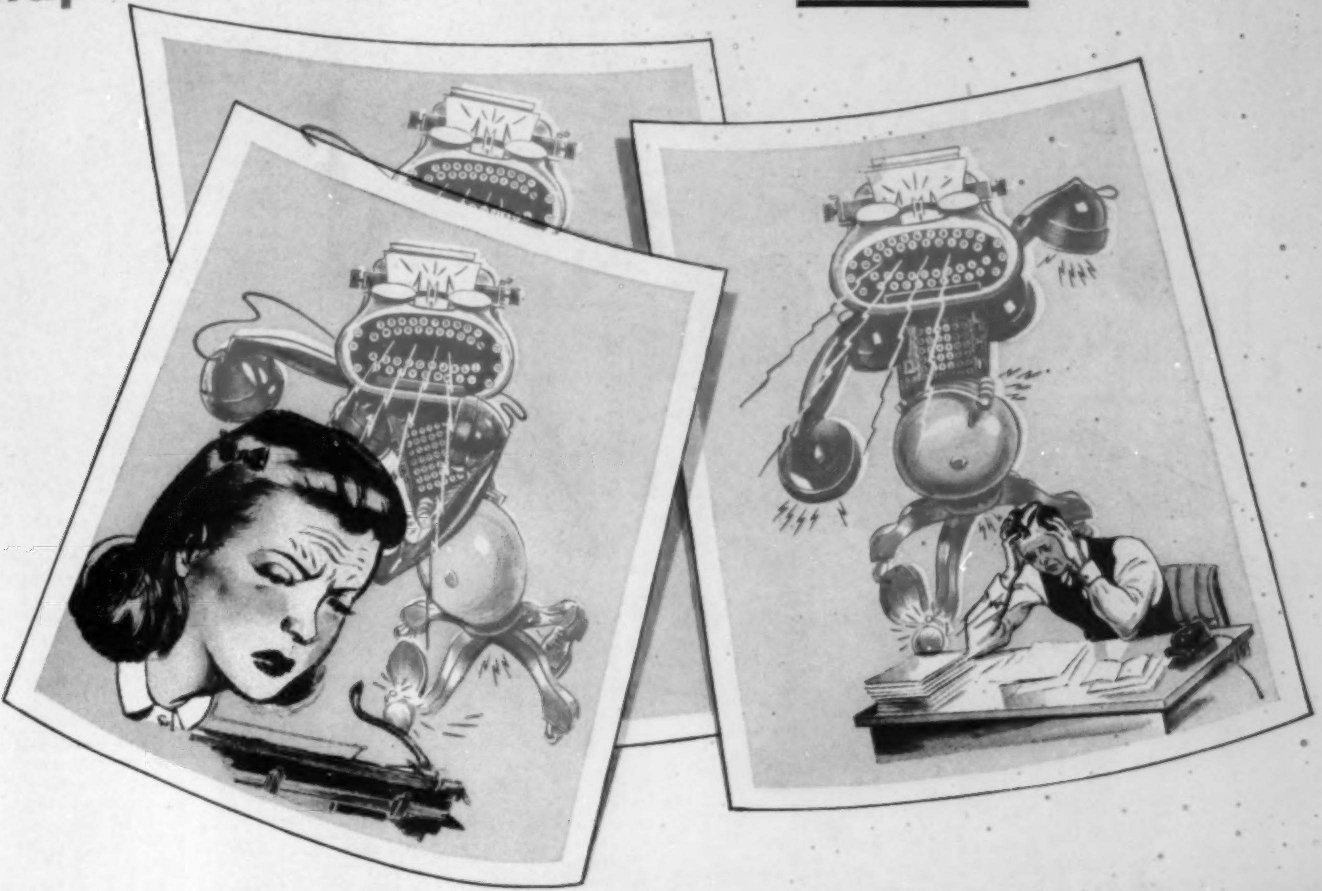
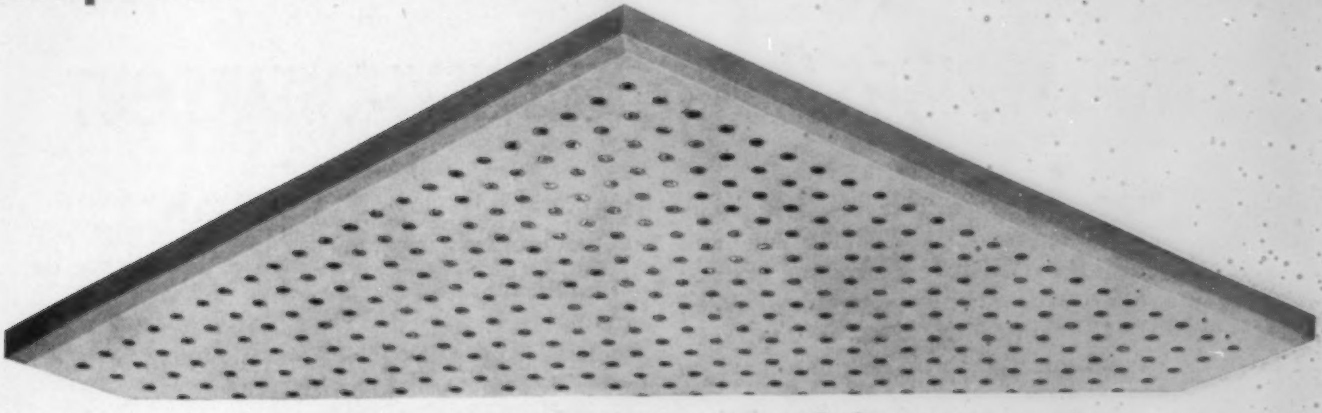
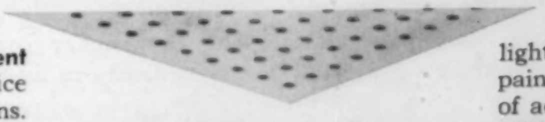
Snapshots of a Noise Demon at work



Snapshot of the ceiling that ends Noise Demons



It's Armstrong's Cushiontone*



THERE'S NO PEACE for your client—or his staff—when his office is infested with noise demons. These insistent pests are born in the din of clattering machines, loud voices, ringing bells. They prevent concentration, breed errors, and reduce efficiency.

That's why so many architects today are recommending Armstrong's Cushiontone—the economical ceiling that traps noise demons. The 484 deep holes in each 12" square of this fibrous material absorb up to 75% of all noise that strikes the ceiling. Cushiontone is also an excellent light reflector and can be repainted many times without loss of acoustical efficiency.

NEW FREE BOOKLET gives all the facts. Write for your copy to Armstrong Cork Company, 2401 Stevens Street, Lancaster, Penna.

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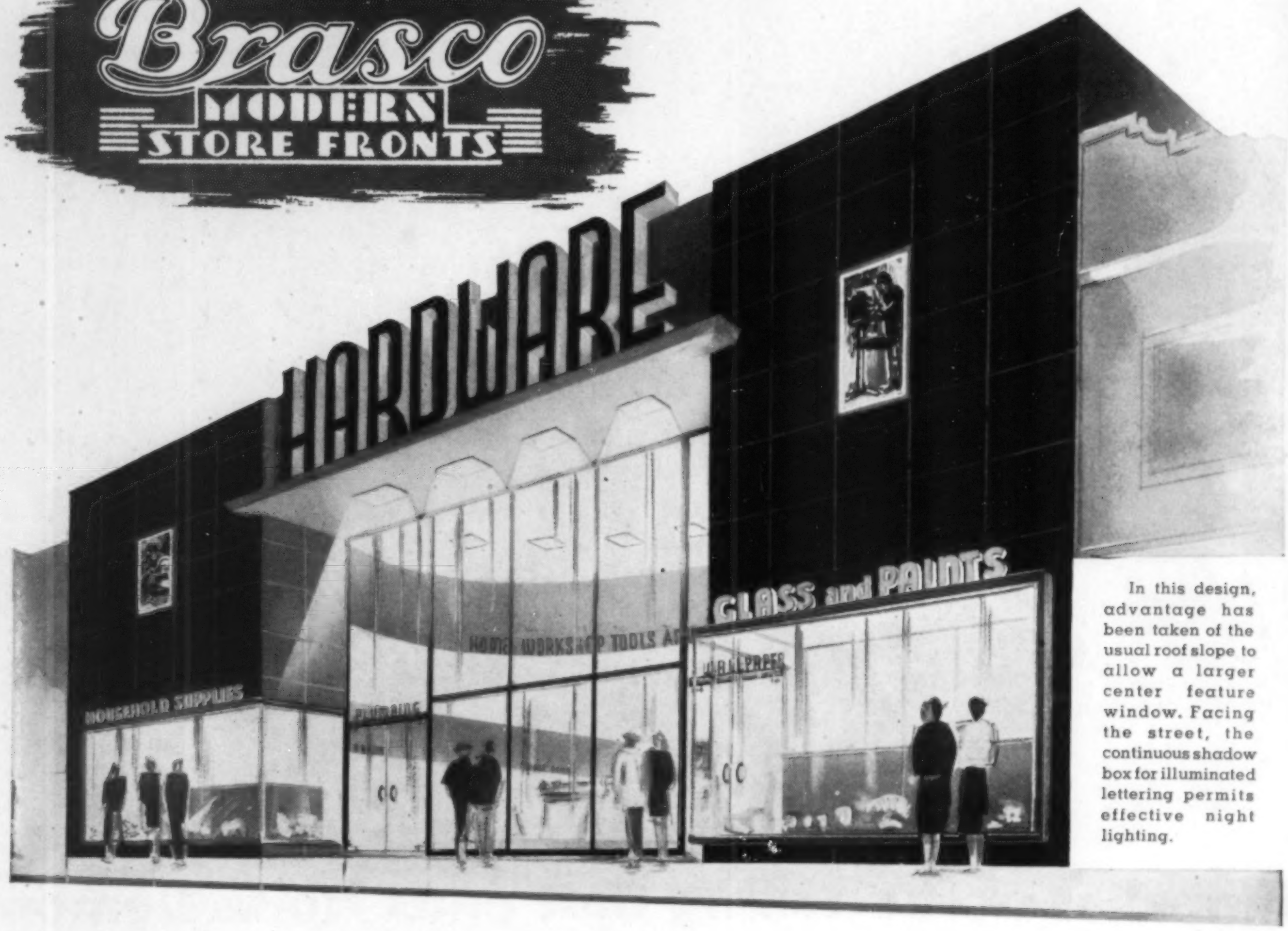
Brasco
MODERN
STORE FRONTS



In this design, advantage has been taken of the usual roof slope to allow a larger center feature window. Facing the street, the continuous shadow box for illuminated lettering permits effective night lighting.

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THERE'S more than meets the eye when you admire the trim lines and attractive finish of a modern Brasco Store Front. Sound engineering, backed by 30 years' experience, gives assurance that Brasco's beauty is built to last.

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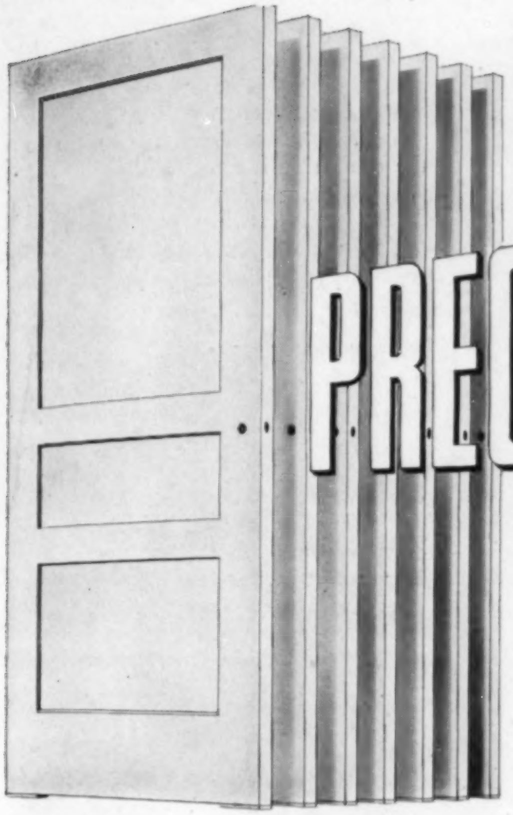

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FACTRI-FIT SPECIFICATIONS ★

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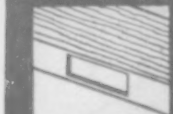

7" from top, 11" from bottom. Standard butt on 1⅜" doors, 3½"x3½"; on 1¾" doors, 4"x4". Square corners. Center gaining for heavy construction is equi-distant between.

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Doors prefit to exact net book sizes listed in U. S. Commercial Standard 73-43. Doors scuff-stripped for protection.

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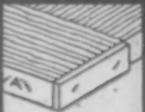
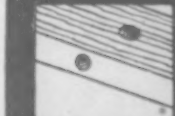


FACTRI-FIT LOCK BORE



All boring to center knob 36" from bottom of door. Diameter of bore-in, 15/16"; length of bore-in, 3¾" from edge; face plate, 1" x 2¼" x 1/16", square shape, cross-bore, ⅝" diameter on 2⅜" center. These standard specifications fit virtually all nationally-distributed hardware. Other machining on special order.

FOR BETTER BUILDING

Steel units of a new kitchen line, and a refrigerator featuring accessibility

KITCHEN UNITS

Flexibility and adaptability are the goals of a new line of 12 steel kitchen units which can be bought separately or as a complete package, installed just as the housewife and the size of the kitchen demand. The line includes five types of sinks and sink cabinets, varying in width from 42 to 66 in.; six types of wall cabinets, ranging in width from 24 to 66 in.; and one type of base cabinet, 24 in. wide.

The same company offers a new *Shelvador Refrigerator* featuring maximum accessibility. Five food shelves are on the inside of the refrigerator door, providing storage space for bottles, eggs, fruits, processed foods. The Crosley Corp., Cincinnati 25, Ohio.

HEATING

Electric Unit Heaters

Under terms of a license granted by the Wesix Electric Heater Co., San Francisco, the Westinghouse Electric Corp. has acquired the right to use the basic principles involved in the design, construction and control of unit type electric heaters. Models comprising the new line will range from an easily portable 1250-watt, 110-volt floor unit to 4 kw, 220-volt floor and wall models. All of the 220-volt units will have built-in automatic thermostatic control. The Westinghouse Electric Corp., Emeryville, Calif.

Circulator Fan

Designed to prevent cold floors, the new *RECO Heat Circulator Fan* blows upwards, the air traveling along the ceiling and down the walls, carrying the super-hot air with it and intermixing it with the room air, providing uniform temperature throughout the room. It is especially recommended for hard-to-heat rooms and rooms which are not constantly heated. Reynolds Electric Co., 2650 W. Congress St., Chicago 12, Ill.

PHOSPHOR POWDER

A new phosphor powder similar to the powder used in present fluorescent lamps except that it changes the energy wavelengths to ultraviolet, makes possible two new types of lamp: a fluorescent type sunlamp and a germicidal lamp for use with poultry and animals.

Not yet available, the *F-type Sunlamp* will be made in 20-watt and 40-watt sizes identical in dimensions and electrical operating characteristics to present fluorescent lamps of the same wattages. The difference is in the special ultraviolet-transmitting glass which is coated inside with the phosphor powder. The lamp can be combined with existing fluorescent lamps in some present office, factory, home or store fixtures.

A thin coating of the phosphor powder on the inside of 15- and 30-watt germicidal lamps combines germ-killing with ultraviolet energy. Not recommended for human use, the lamps are now available in limited quantities. General Electric Co., Bridgeport, Conn.

WALL COVERING

A new wall covering called *Congowall* consists of a lustrous baked enamel surface in a cameo-like tile design on a special patented, flexible, water-resistant felt backing. According to the manufacturers, Congowall will not warp or shrink, buckle or bulge, crack or craze, chip off or peel; it is easily installed over any firm, smooth, dry surface, and is suitable for both new work and remodeling. Offered at present in five colors—peach, green, black, blue and white. Congoleum-Nairn Inc., Kearny, N. J.

Felt-backed wall covering has baked enamel surface that looks like tile

ALUMINUM VENETIANS

Laboratory tests of an aluminum slat venetian blind just announced show a heat reduction of 75 per cent, the manufacturers report. One side of the slat is polished to reflect the heat, and the other side is satin finished to prevent the metal from absorbing heat. Dust and grease will not adhere to the treated metal. MacArthur Smith and Associates, 134 S. LaSalle St., Chicago 3, Ill.

FARM QUONSET

A new type Quonset building—a cousin to the round-roofed Quonset of Navy fame—has been designed especially for rural utility purposes and now is in production.

The new, low-cost, packaged, all-steel building differs from the Navy Quonset in that it has a straight side. Designated the *Quonset 24*, this farm building has an unobstructed interior suited particularly for garage and storage of implements, tools and vehicles, or as an open-front loafing barn for animals.

A straight-sided Quonset for farm use

The basic unit is 24 ft. deep and 12 ft. long. As many 12-ft. extensions as desired can be added to increase length. Sliding doors and section panels are available. Great Lakes Steel Corp., Stran-Steel Division, Penobscot Bldg., Detroit 26, Mich.

HOUSEHOLD ITEMS

Radios

Included in Westinghouse's new line of postwar home radio receivers are nine sets ranging from an ultramodern 6-tube, 6 by 6 by 9 in. portable table model to a 14-tube radio-phonograph combination set housed in a modified Chippendale console cabinet and equipped to receive standard broadcasts, foreign shortwave broadcasts and frequency modulation programs. Television receivers will be ready for the market early next year.

Fourteen models, ranging from small plastic table models through portables, radio-phonograph combinations in both

(Continued on page 22)

Think in terms of

STRAN STEEL

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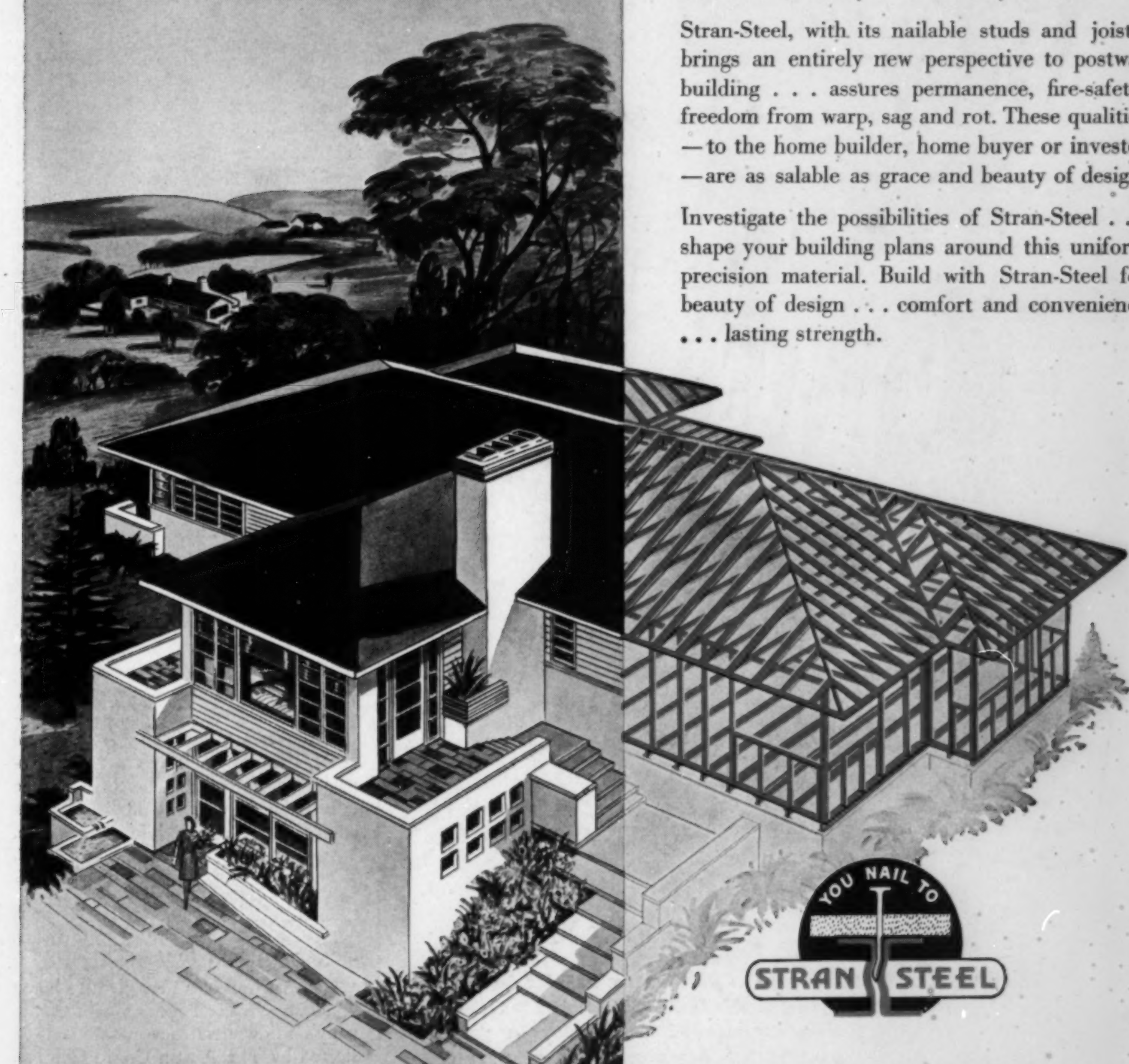

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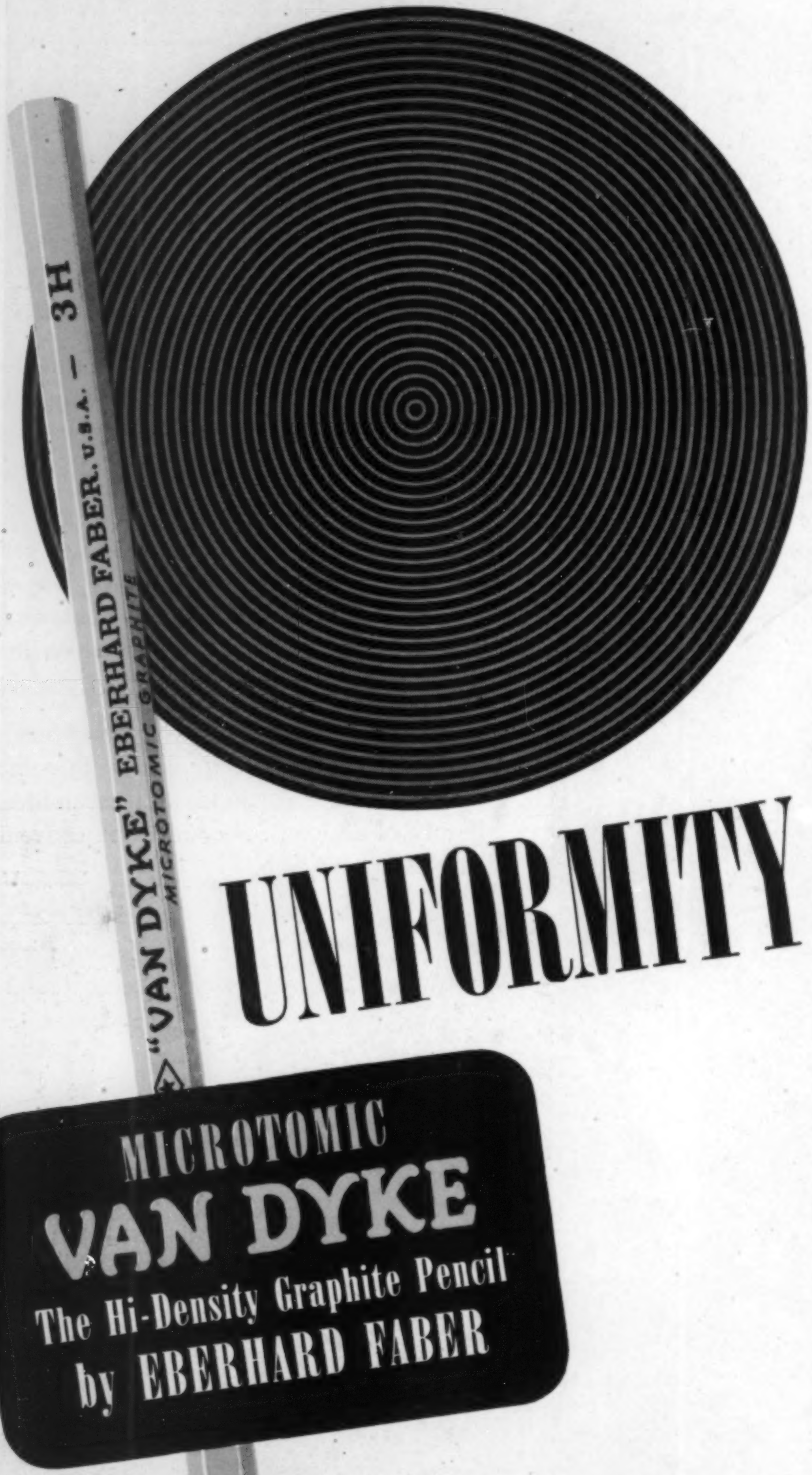
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FOR BETTER BUILDING

(*Continued from page 20*)

table models and consoles, and full-sized console furniture model radios, comprise the new Stewart-Warner line. New and exclusive features of all sets include the *radair antenna,* a built-in loop designed to pick out faintest signals but to repel static interference, and a *signal sentry,* a device to eliminate fading and to bar unwanted hum or other noises. An automatic record changer, operated with only one control, is incorporated in the radio-phonograph combinations.

Refrigerator plus frozen food chest

Refrigerators

Three 7-ft. models and one 9-ft. model are on the 1946 Kelvinator production schedule. Topping the line is the new *Moist Master,* a triple range unit with special provisions for freezing and storing frozen foods, for the safe-keeping of foods of high moisture content, and for general storage of all average foods. In effect a combination refrigerator and frozen food chest, the new unit has a freezer capacity of approximately 9 lb. of ice cubes, and more than 35 lb. of packaged frozen foods. Kelvinator Division, Nash-Kelvinator Corp., Detroit 32, Mich.

NEW BUILDINGS

Paper Goods Plant

Construction of a new plant to house The American Paper Goods Company's midwestern operation has been started by The Austin Co. in Chicago.

The new building was especially designed by Austin to accommodate new high-speed presses and machinery for the production of ice cream containers, beverage cups, specialty bags and other products. It will be one-story, with

(*Continued on page 102*)

A great name in Lighting

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MANUFACTURERS' LITERATURE

COPPER CONSTRUCTION

Research Solves Problem of Stress Failures in Sheet Copper Construction. A report on two years of research into the behavior of copper installations, with specific recommendations for design and construction methods directed toward the elimination of stress failures. Includes 30 detail sheets showing methods of installation and some of the basic principles in the use of sheet copper. Diagrammatic drawings of parapet walls, seam roofing, open valleys for slopes, fascia gravel stops, built-in gutters, covers over expansion joints, etc. 96 pp., illus. Revere Copper and Brass, Inc., 230 Park Ave., New York 17, N. Y.*

FIBER BOXES

Vs-Boxes. A report on the weatherproof solid fiber box, including a description of wartime uses and various tests used to insure its quality. 16 pp., illus. Container Testing Laboratories, Inc., 45 E. 22nd St., New York, N. Y.

HANGARS

Low Cost Housing for Small Airplanes. Basic ideas on the layout and construction of individual wood hangars in single and multiple units, wood repair shops and large commercial hangars. Offers 10 reasons why wood hangars are thrifty. 8 pp., illus. Timber Engineering Co., 1319 18th St., N.W., Washington 6, D. C.

HARDWARE

Solid Brass and Bronze Hardware. A description of Mount Vernon and Monticello and their solid brass hardware fixtures; examples of modern brass and bronze hardware. 16 pp., illus. Copper & Brass Research Assn., 420 Lexington Ave., New York 17, N. Y.

HEATING

A Step Ahead in Hospital Heating (Bulletin No. 633). A description of differential heating and how it works; cost analysis; typical installations in hospitals. 24 pp., illus. C. A. Dunham Co., 450 E. Ohio St., Chicago 11, Ill.*

INSULATION

Foamglas Insulation for Tanks. The method to be used in installing Foamglas for the insulation of high temperature tanks, towers and ducts. Specifications and details, table of block sizes. 24 pp., illus. Pittsburgh Corning Corp., 632 Duquesne Way, Pittsburgh 22, Pa.*

LIGHTING

Engineered Lighting and Control Equipment (Catalog No. 945). A condensed catalog, with photographs and detail drawings, specifications and engineering details. Equipment listed includes stage lighting, exit and directional signs, indirect and built-in lighting, fluorescent troffers, stage switchboards. 10 pp., illus. Hub Electric Corp., 2219-29 W. Grand Ave., Chicago 12, Ill.

G-E Slimline and Circline Lamps Seen in Many Roles. The use of the two types of fluorescents in store design. Diagrams and sketches of store interiors, special display units, and store lighting fixtures. 12 pp., illus. General Electric Co., Nela Park, Cleveland 12, Ohio.*

MEMORIAL TABLETS

Bronze Honor Rolls. Descriptive circulars featuring the Willard "Add-a-Name" type of cast bronze honor roll tablet. 6 pp., illus. The Willard Bronze Co., 3608-16 Colerain Ave., Cincinnati 23, Ohio.

PLASTICS

Plexiglas Design Manual. Design methods for acrylic plastics. Complete with diagrams and illustrations of various products. 56 pp., illus. Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.*

Forming Articles from Extruded Tenite Sheeting. Nine primary operations in the fabrication of sheet plastic articles, and the equipment which may be used. Includes several diagrams of equipment. 12 pp., illus. Tennessee Eastman Corp., Kingsport, Tenn.*

SILICONES

Dow Corning Silicones, New Engineering Materials. Catalog listing all of the silicone products now available, and presenting many industrial uses. Contains charts and graphs demonstrating the properties, tables of physical characteristics, etc. 12 pp., illus. Dow Corning Corp., Midland, Mich.

STEEL

In War . . . In Peace, Republic Enduro Stainless and Heat-Resisting Steels (Adv. 430). The war applications of Enduro steels, and suggestions for their translation into peacetime terms. 32 pp., illus. Republic Steel Corp., Advertising Division, 3100 E. 45th St., Cleveland 4, Ohio.*

Know Your Steel When You Build or Remodel. The uses of special-purpose sheet steels in building construction, built-in equipment and appliances. 24 pp., illus. The American Rolling Mill Co., 1717 Armco Ave., Middletown, Ohio.*

STEEL BOILERS

Standard Electric-Welded Steel Boilers (Bulletin No. S-67, 5th ed.) Full information including diagrams and specifications and dimension tables. 8 pp., illus. The Brownell Co., 430 N. Findlay St., Dayton 1, Ohio.

High Pressure Heavy Duty Firebox Steel Boilers (Catalog 96). Illustrates and describes with fully detailed tabulations and diagrams three series of steel riveted firebox boilers. 20 pp., illus. Kewanee Boiler Corp., Kewanee, Ill.*

TURBINES

The Gas Turbine Power Plant Now a Reality. History and features of the gas turbine. 20 pp., illus. Elliott Co., Jeannette, Pa.

WATER HEATERS

Nema Standards for Electric Water Heaters. Practical information on performance, rating, testing and manufacture of electric water heaters. Includes schematic diagram showing standard connections and color coding. 8 pp. Natl. Electrical Mfgrs. Assn., 155 E. 44th St., New York 17, N. Y. 25 cents.

Test Specifications, Automatic Electric Storage Water Heaters. Intended to establish a uniform testing procedure to make possible the determination of the performance of electric storage water heaters in terms of safety, effectiveness, durability and convenience. 10 pp. Natl. Electrical Mfgrs. Assn., 155 E. 44th St., New York 17, N. Y. 50 cents.

LITERATURE REQUESTED

The following architects and firms request manufacturers' literature:

F. W. Langhenrich, A.I.A., 4541 W. Washington Blvd., Chicago 24, Ill.

Lundy Construction Co., 1896 W. 4th St., Williamsport, Pa.

Sherman & Zamshnick, Architects, 62 William St., New York, N. Y.

Arthur N. Starin and Associates, Architects, North Finley Ave., Basking Ridge, N. J.

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* *Other product information in Sweet's File, 1945.*

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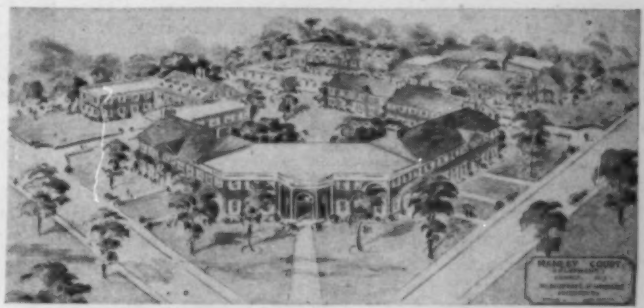

Manley Court Apartments, Summit, New Jersey—Emil A. Schmidlan, architect, East Orange, New Jersey—Elmer N. Rinhart & Co., Inc., property managers

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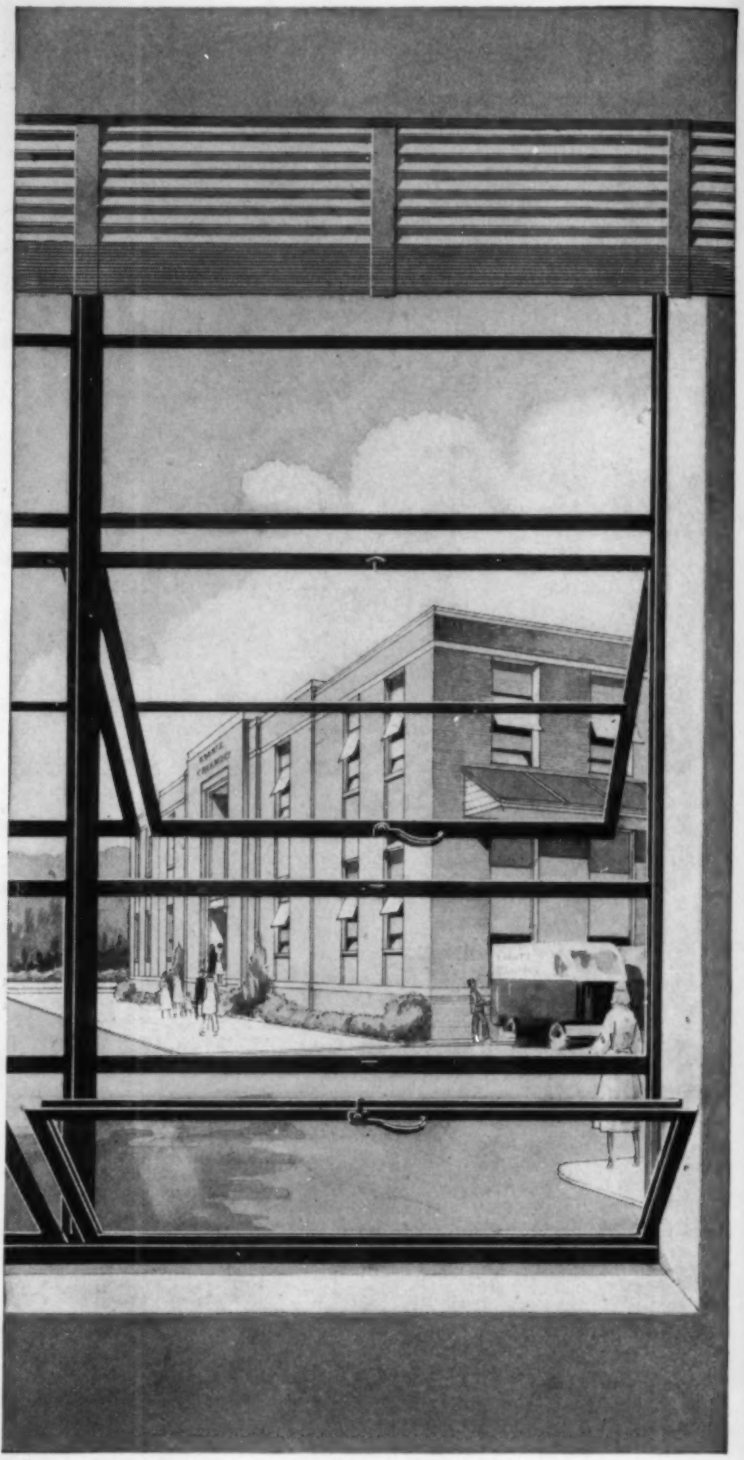
Koontz Creamery, Baltimore, Maryland. Architect
Carl W. Roes, Baltimore, Maryland. Contractor
Edgar S. Armacost, Westminster, Maryland.



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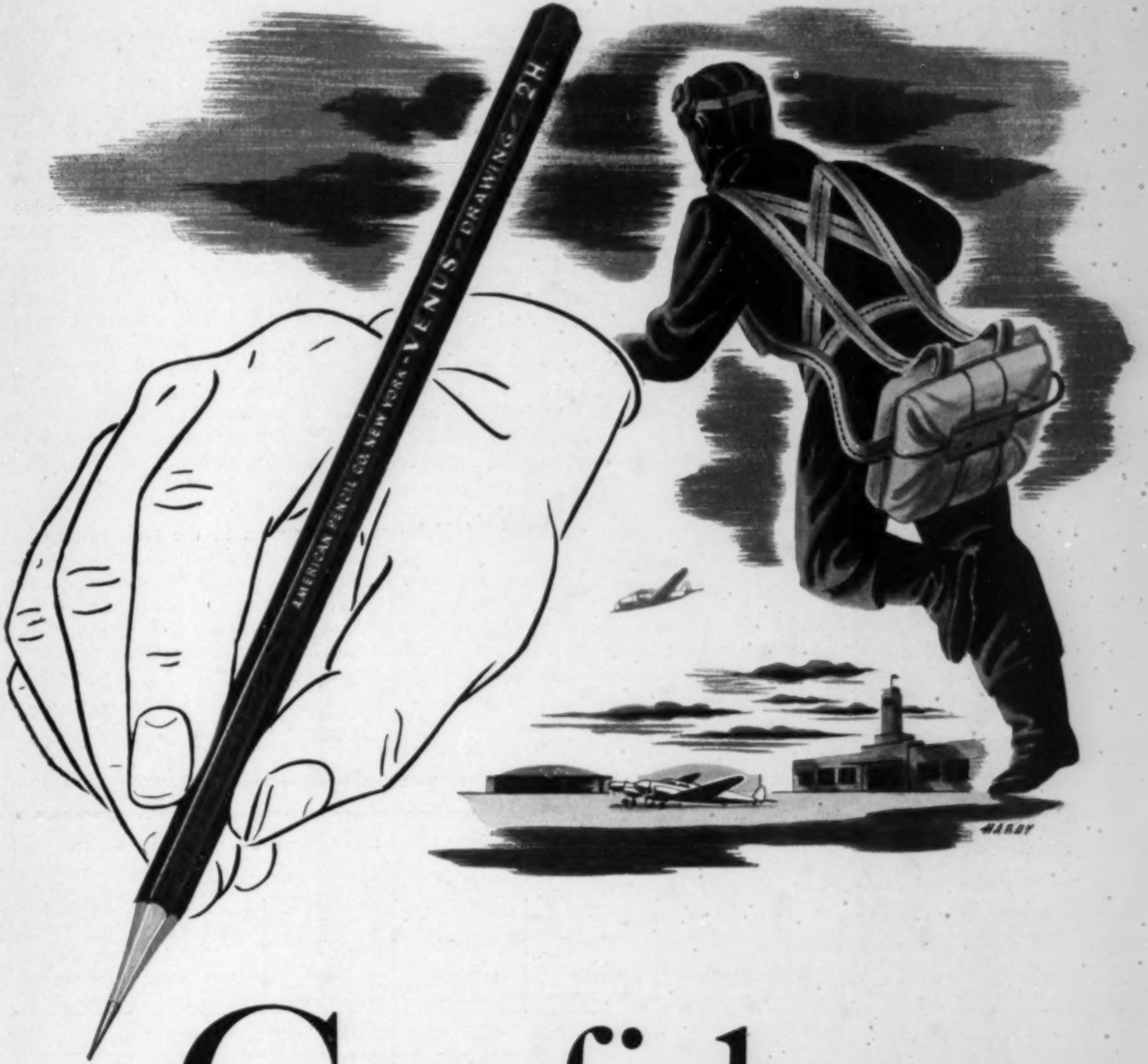
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REQUIRED READING

HOW MUCH BUILDING?

Construction Revival—Guide Signs to Peacetime Expansion and Prosperity. A Market Study by F. W. Dodge Corp. New York 18 (119 W. 40th St.), F. W. Dodge Corp. 1945. 11 by 8¼ in. 32 pp.

How much actual building will there be in the next decade? That is what everyone connected with the building field—and everyone interested in the national economy—naturally wants to know. Estimates by the carload have appeared, some of them based soundly on statistics, others amounting to little more than personal guesses or wishful thinking. This market study by the F. W. Dodge Corporation, however, is really more than an estimate: springing from the company's own summary of work actually planned, it is an analysis of the building volume that can reasonably be expected during the next ten years.

"Construction revival has begun," the study states, "ushering in a return to normal peacetime competitive market conditions. As transition problems are surmounted, volume will snowball."

What are these transition problems? For architects and engineers: "securing adequate staffs of designers and draftsmen, adequate information on materials and equipment available for early use in urgent projects, information on new products and services." For builders and sub-contractors: "man-power, material supply, price and wage adjustments, possible transportation shortages. For material and equipment manufacturers: "reestablishment of orderly marketing service to the field; sales and production manpower; and (for an important minority) reconversion of plant facilities."

On May 31, 1945, when the company's statistical tabulation of V-day projects was discontinued, the Dodge records of postwar projects showed a total of 99,638 specific projects located in the 37 states east of the Rocky Mountains, the estimated cost of which totaled $15,746,202,000. Since June 1st "hundreds of millions of dollars in additional preliminary and design-stage projects have been reported and tabulated on a new basis as currently contemplated work."

The Dodge Corporation disagrees with the commonly expressed opinion that the volume of public work in blueprint stage is inadequate to meet the needs of the transition period. On the contrary, "unduly strong pressure to push public building and engineering work in the recovery period would create intense competition for men and materials and add to the inflation threat." As for private building, it is reasonable to assume, the study states, "that most private projects in the design stage are scheduled for sites already selected and either owned or controlled by option. For such projects bids can be taken and decisions made fairly quickly."

As shown in the table below, this study breaks down estimated construction into the various classifications for both private and public projects. It also has a separate chart for each of the classifications, with special notes on the program of each.

(Continued on page 122)

prewar and prospective postwar construction

valuation (in millions of dollars) of construction contracts and projected or estimated construction, 37 eastern states

classification	contracts year 1938		contracts year 1939		contracts year 1940		postwar projects design stage		additional backlog of contemplated projects		estimated annual average postwar decade*
commercial buildings	216	199	247	228	318	265	477	433	185	143	636
manufacturing buildings	121	110	175	164	443	326	305	295	318	305	282
schools, colleges and science buildings	334	32	201	21	147	42	840	230	668	106	402
hospital and institutional buildings	115	28	83	24	94	27	543	256	368	68	201
public buildings	114	2	110	2	80	3	143	0	222	0	160
churches and other religious buildings	36	35	38	38	46	46	136	136	94	93	127
social and recreational buildings	108	77	82	56	63	48	188	112	172	79	195
miscellaneous non-residential buildings	28	17	29	16	104	20	118	34	131	38	107
total non-residential	1072	500	965	549	1295	777	2750	1494	2158	832	2110
hotels, dormitories and apartment buildings	256	202	385	243	331	194	659	467	237	113	1000
one- and two-family houses	702	692	932	896	1155	1077	446	422	665	609	2000
total residential	986	900	1334	1144	1597	1277	1108	890	910	725	3129
total building	2058	1400	2299	1693	2892	2054	3858	2384	3068	1557	5239
public works and utilities	1139	93	1251	149	1112	148	3896	224	4925	136	2109
total construction	3197	1493	3550	1843	4004	2202	7754	2608	7993	1693	7348

black figures denote total of private plus public projects • figures in color indicate private projects • *at March 1945 levels of construction costs

Housing in the Headlines

✦ The plight of the returning service men who can't find homes to buy, much less rent, has aroused the public, the press, and the politicians. Panaceas, palliatives and pronouncements, plus six-to-sixteen-point programs are offered daily. Emergency measures must be, and are being, taken—most of them makeshift and inadequate, but the best possible in the crisis. Key building materials and equipment just are not available. The task of increasing the production of building materials by increasing wages on one hand, and controlling price rises with the other, is far from easy. The profit motive can be made to produce both materials and houses, but at what price? Must we choose between houses and inflation? Will houses really be built in quantity under priorities and price controls? The debate goes on.

✦ Amid the confusion of words, ideas and arguments, the finger of scorn is pointed at the "building industry," that inept, backward, horse-and-buggy, hidebound, medieval, handicraft industry—that anachronism among the shining examples of industrial efficiency. Can this be the same industry that produced Oak Ridge in record time, that built the camps, the war factories, the naval and air bases, whole new complete towns for war workers?

✦ Is it possible that the critics of this obsolete industry are ready now to get into it themselves and show the waiting world that they are able to bring about the great reformation that is necessary before houses, say, can be produced and erected in sufficient quantities to meet current needs, at low unit costs and at attractive profit to themselves? Does their superficial review of the complications and ramifications, conflicting interests, vested interests—real estate, political, labor, manufacturing, financing, legal interests—intrigue them into becoming the integrating-entrepreneurs who will bring about the changes which they have discovered to be necessary, and which the building industry has itself known for so many years?

✦ Their confidence, enthusiasm, clear-thinking analytical minds, their ingenious and ingenuous ideas, plus their influence-where-influence-counts, to say nothing of their abundant venture-capital, would be welcomed by those now within the industry who have been working toward the same ends. For there are those within the industry who are cognizant of the need for change, who know the direction of progress, and who understand from bitter experience the difficulties, obstacles, and limitations that are encountered on every side every day.

✦ Perhaps the critics-turned-constructors will find new means to eliminate ignorance, fear, inertia, greed, short-sightedness, entrenched interests. Then will the industry make rapid progress, building codes will permit any material, equipment or structural system to be used so long as its performance is up to a scientific standard. Then will labor increase its productivity and efficiency, train thousands of young workers, eliminate its restrictive practices and jurisdictional disputes, being assured of adequate yearly income and steady rather than seasonal work. Then will land costs be related to land use, and financing will protect interests of both mortgagee and mortgagor. Then will come the technical revolution; then will every new invention find a ready sponsor, have a fair trial and meet with no unfair competition. Eventually will come the integrated shelter-service industry so rationally envisioned by Buckminster Fuller.

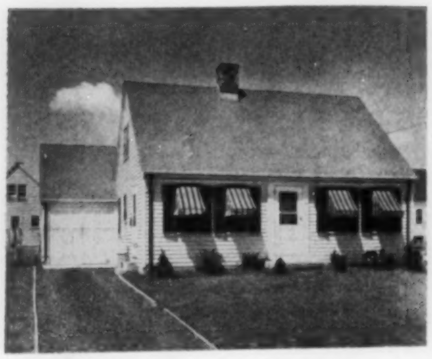
✦ Or is it the function of the critics to remain on the sidelines writing the headlines to inform and arouse the public? This should help the building industry to make more rapid progress in the direction in which it is already going. The sideline quarterbacks may accomplish most with fewer boos, more lusty cheers, or perhaps by joining the motley team on the field to show just how the game can and should be played.

Kenneth K Stowell

EDITOR

PARADOXES IN THE COST PICTURE

Contractors' bids now necessarily are uncertain quantities, seem to bear no relation to theoretical indices. Reading between the lines—the future probably will see the two moving toward a meeting on middle ground



If you can't sensibly study building costs in the Gypsy Tea Room, the fact remains that you can't get very far without doing some mind reading. The most profound study of charts and indices, though informative, still leaves you at the academic level; it won't explain contractors' bids.

"The past few months," says E. H. Boeckh, building costs expert, "have seen a growing practice among established contractors of marking up the cost of the end product. In some cases it is a contingency mark-up to cover the uncertainty of labor and materials supply, while in others it is a courteous way of refusing the work. . . . In many cases with the submission of the bid the contractor makes the counter proposal of a cost-plus contract." In short, to make a lump-sum bid the contractor must do some crystal gazing, but, being practical, he protects himself against contingencies.

The architect and the client then find themselves faced with the crystal-gazing assignment. Shall they wait for supply conditions to remove some of the uncertainties, with the risk that prices will stabilize at still higher levels? Or shall they start redoing the plans, paring down the project? This last question is now giving architects some headaches peculiarly their own. How much expensive redrawing must they do, possibly for projects that will never be built? True, they receive something for preliminary plans, but they will never earn a living drawing merely dream projects.

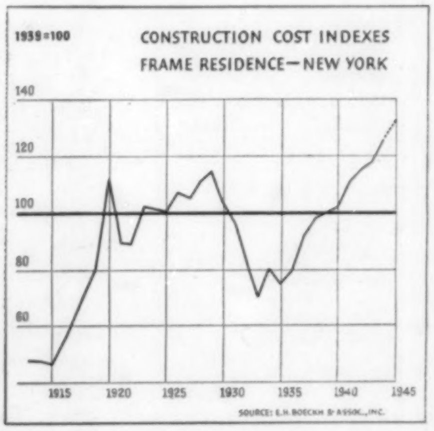
Presumably at some point in the not-distant future—possibly spring—contractors will be able to make more accurate estimates of their costs. A growing supply of materials will resolve some of the uncertainties. And by then labor is expected to be in better supply, and more should be known about wage levels. It might be said, then, that to the extent that bids contain margins for protection against virtually black-market conditions, they should come down. But other factors may work in the other direction.

Mr. Kellogg traces basic factors of material supply and material prices in interesting detail in the following article. In projecting his facts ahead he makes two important assumptions: "(1) that price controls generally will remain effective until a relatively normal supply position is attained; (2) that there will be no significant increase in the general price level." He goes on to point out that certain major material items—e.g. lumber—may be expected to stabilize at slightly lower levels; others may show some rise, with the balance in favor of an over-all increase.

The wage situation cannot be so neatly handled. And, as this is written, the wage battle is not yet resolved, but the general assumption is that wage costs will rise.

The conclusion might be put forth that *true costs* are expected to stabilize at a somewhat higher level, but that *actual bids* are expected to be more in line with actual costs of labor and materials.

Costs are up; there's no getting away from it. But, as Mr. Kellogg's charts show, "prices of building materials in general are not out of line with prices of other goods." And when some stabilization is achieved, total building costs should prove to be in line with other factors in living costs.



SOURCE: E.H. BOECKH & ASSOC., INC.

In 1939 houses like the little one above were built to sell for $4,500; now the minimum would be $7,000. The increase from 1939 prices is 55 per cent; while the chart shows a rise in the same period of only 32 per cent. Many individual instances would show greater discrepancies

MESSAGES IN MATERIALS PRICE TRENDS

A charting of postwar price trends—after both world wars —provides a guide to future cost possibilities, and pitfalls

By Lester S. Kellogg

Acting Chief, Prices and Cost of Living Branch, Bureau of Labor Statistics, U. S. Department of Labor

Costs of home construction are divided almost equally between expenditures for on-the-site labor and services for materials. The prices of materials only, and especially wholesale prices, will be treated here. Prices at the dealer-to-contractor level (or retail prices), collected by the Bureau in 53 cities, show price movements similar to those at wholesale, although there are some local differences—e.g., retail brick prices in some cities advanced more than prices at the brick yards, as dealers were forced to turn to more distant suppliers and pay higher transport charges. Price charges by manufacturers and producers—what we often call "wholesale prices"—may therefore be used effectively to show the picture of price movements in the field as a whole.[1]

World War I and Aftermath a Guide for Today

Of special significance, as a guide to us today, when we are looking anxiously toward the future, is the record of price advances after the November, 1918 Armistice. Prices of building materials increased about 49 index points or 92 per cent in the 4½ years between July, 1914 and November, 1918, as can be seen in the chart on the following page. The voluntary—only partially effective—price controls which had been in effect during the last year and a half of the war were dropped almost immediately after the Armistice, and all restrictions on private activity were removed within a period of days. The rise in building materials prices after the Armistice was both greater and more rapid than during the war, and by the spring of 1920 were nearly 220 per cent above July, 1914 levels. Many builders throughout the country today, without thinking of all the serious implications of such a price rise, are reported as hopefully saying: "We're in for another boom like we had in the early 1920's." This reflects a dangerous inflation psychology.

As a warning, it should also be observed that the decline in prices from the speculative post-Armistice peak in early 1920 was just as rapid as the rise. Accompanying that price decline there was a collapse of commodity markets, a fall in the average price of lumber of 59 per cent from March, 1920 to August, 1921 (yellow pine flooring from $160 to $91), a tremendous rise in business failures, and a general erasure of the gains which had been made earlier. The deflationary readjustment lasted only a short time, but it was expensive for those who got caught.

Residential rents during World War I, as in World War II, were relatively stable for unfurnished properties, rising only 5 per cent during the 4½ year period. With the end of the war and the elimination of controls and increased demand for housing, however, residential rents began to advance rapidly and continued upward for nearly 6 years, reaching a peak in 1924, 75 per cent above prewar levels, and staying close to that peak through the rest of the Twenties. This postwar rise in residential rents represented, in part, merely an adjustment of rental rates to prices of commodities in general. The postwar price level was stabilized well above the prewar level, and an increase in rents was necessary to bring housing costs back into their prewar relationship with prices of commodities generally.

The rapid rise in materials prices following the Armistice, it is believed, had a retarding effect on private building. The tremendous growing demand for housing could not be satisfied by buildings already in existence, plus the small amount of new building, and rents continue to rise.

When prices of building materials were readjusted downward in the depression of 1921, building increased rapidly and continued upward through the period of speculative overbuilding which reached a peak in 1927. After 1927 building construction and rents moved gradually downward, with the decline accelerated by the depression following 1929.

Price Changes in World War II

Compared with price movements during World War I, advances in building materials prices during and since World War II so far have been moderate. Over the six years since August, 1939, wholesale prices of building materials as a group have advanced about 32 per cent, and the major part of this increase was in the price of lumber, which rose very rapidly during the early part of the war period — up to 1942. Other building materials showed much smaller price increases, but almost all of them now cost substantially more than they did in 1939. Except for lumber, prices of building materials have increased much less during World War II than during World War I.

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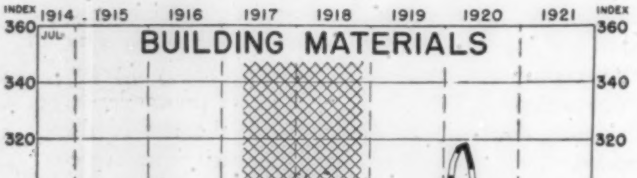
[1] *Throughout the war period the Bureau of Labor Statistics has maintained its price series for 40 important building materials from dealers in 50 cities in the United States—three more cities have recently been added. These series of data are continuously available for answering inquiries with respect to these prices.*

WHOLESALE PRICES OF BUILDING MATERIALS

in World War I and World War II



Brick and tile, which rose 90 per cent in price between July, 1914 and November, 1918, advanced 20 per cent between August, 1939 and August, 1945; cement rose 80 per cent between 1914 and 1920 and 9 per cent in this war; paint and paint materials, 160 per cent and 31 per cent; structural steel, 161 per cent in World War I, no change in price during World War II.

The relative stability of prices of building materials during the war years just past may be attributed directly to the excellent cooperation between business and government in "holding the line."

Residential rents during the war just ended have also remained relatively stable, rising only 4 per cent in the past six years, for the same kind of housing in our large cities. In spite of the pressure against rent ceilings in the last year because of the tremendous demand for adequate housing, the higher costs of maintenance and repairs, and because other groups in the community have enjoyed relatively greater increases in income than landlords, rents have continued to be held. There have been some hidden advances in the cost of shelter resulting from deferred maintenance, reductions in services given by landlords, reconversions of old buildings, and successive bidding up of real estate sales prices. But in spite of these, the rent picture during the war has generally been one of stability.

Prospects for Building Materials Prices in 1946

There have been reports that postwar construction for rental purposes cannot profitably be carried on at present building costs and present rental rates. It seems probable that rents for new housing, particularly in the middle and upper income classes, will be higher in the next several years.

"What is going to happen to building materials prices over the next few months or the next year?" is a question of major current interest. No forecast can be made with assurance; important elements in our present position may be pointed out, however, and some attempt may be made to assess their relative significance.

Two basic assumptions are important in what follows: (1) that price controls generally will remain effective until a relatively normal supply position is attained; (2) that there will be no significant increase in the general price level. These are reasonable assumptions under current conditions. On this basis, we may adopt the old stand-by of the economist and divide the elements in the present situation into those affecting the demand for materials and those affecting the supply of materials.

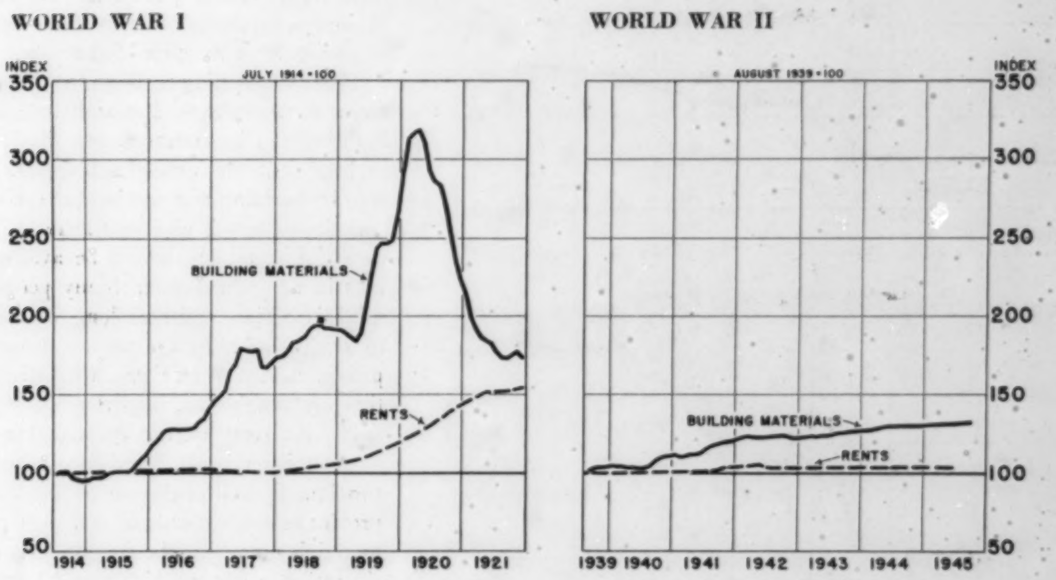
There is a tremendous unsatisfied demand for homes. There is a large amount of doubling-up—two or more families in one dwelling—which will be "undoubled" if housing at reasonable cost is available. The rapid release of our men from the military forces is adding to the demand. Overdue repairs, the maintenance of homes already standing, and a large volume of substandard housing provide a very large backlog of demand for materials. In addition, thousands of families are hoping to own their own homes.

Resources are available to make this demand effective. Liquid savings of individuals amount to more than 150 billion dollars, a good part of which could be used to satisfy these demands if housing can be made available on reasonable terms and if confidence in our economic future is maintained. Much depends upon the early availability of building materials and the stability of their prices.

On the supply side, we will consider important groups of materials individually.

Lumber, at the moment, is the major question mark in the field. Prices are 72 per cent above prewar levels, while stocks in the hands of dealers are at an all-time low. There are 10 per cent fewer lumber dealers now than in 1939, and production is at a rate higher than prewar, but 20 per cent below peak capacity. The principal bottlenecks in increasing lumber production should be solved with the return of more workers to the woods and to sawmills and with increased supplies of equipment, notably trucks and tires. Profits, generally, are high in comparison with prewar levels. On the supply side, therefore, there should be little reason for further increases in prices of lumber, if controls can be held until production for civilian use is stepped up.

Brick and tile prices, as indicated on the chart on the following page, are some 24 per cent above prewar levels, with production far below capacity. An estimated 50 per cent of the plants operating in 1939 have closed. Labor is very short, with an estimated 10,000 workers needed for capacity production. Profits are narrow and price increases may occur before demand for brick and tile is satisfied.


WHOLESALE PRICES OF BUILDING MATERIALS

Compared with Residential Rents

WORLD WAR I

WORLD WAR II

Cement prices are less than 10 per cent above prewar levels and production capacity is adequate. In general, profits in the industry are satisfactory and there are no major problems in returning to full production. The industry now is operating at about 40 per cent of capacity and can increase output to meet expected demand with little difficulty.

Prices of prepared paints have remained very stable over the war period, advancing only 7 per cent since 1939. The substantial rise in average prices of paint materials which has occurred over the six-year period is not expected to put important pressure on prices of finished paints, because of the rapidity with which supplies of these materials are returning to normal and the large number of substitute products which have been developed during the war. The effect of these competitive products already is observable in prices for some materials.

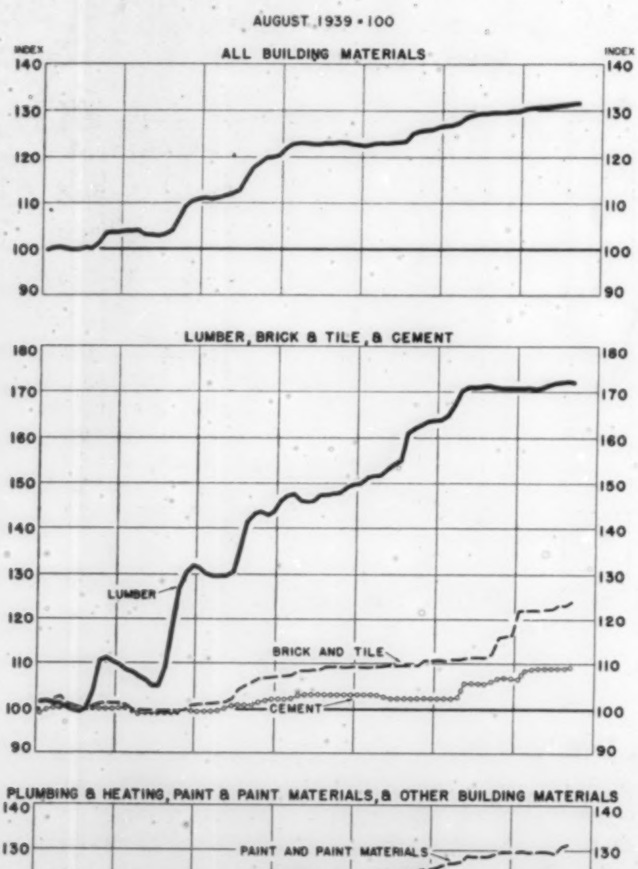
For other building materials—insulation board, roofing, lime, plaster, etc.—no major problems are anticipated. Prices rose less than 10 per cent on the average for these commodities during the war. Profits currently are narrow, but with resumption of full-scale civilian production they should present no serious difficulty.

Heating equipment and plumbing fixtures are about 15 per cent higher in price than in 1939. Some of the equipment on the market is of inferior quality and will have to be junked. Some metals still are scarce and the labor supply is not yet adequate. There is not, however, reason for expecting a substantial rise for this group of products unless prices generally move higher or labor costs rise.

Since V-J Day we have seen the very rapid elimination of war restrictions, and in the field of construction have seen the lifting of Limitation Order L-41. There has been considerable controversy over the speed with which this order was lifted and over the possible immediate effects of the relaxation of controls on civilian building.

The Bureau of Labor Statistics recently has had a number of its representatives throughout the United States visiting building materials dealers and residential building contractors in order to gauge the present situation. These representatives were especially watchful with respect to the four building materials which are currently in tightest supply—lumber, bricks, insulation board and lath, and soil pipe. There is some indication that the supply in relation

BUILDING MATERIALS Wholesale Prices



to the demand has tightened up considerably within the last month.

The principal effect of the supply situation and ceiling prices on lumber has been to alter greatly the methods of distribution. In the southeastern part of the country—where there are numerous small mills cutting Southern Pine lumber—a greater portion of the lumber is now moving directly from the mill to the contractors, while retail lumber yards throughout the nation are suffering considerably from lack of supplies.

Supply presents some very serious bottlenecks in construction. Hardwood flooring is almost impossible to obtain in any part of the country. Soil pipe is generally unobtainable except in those areas where the greater part of it is produced. Radiation is unobtainable in a great number of areas, as are bathtubs. Many of these scarce materials have been raised in price, with OPA authorization, but at the time of our survey these price increases had still not brought stocks to the dealers' hands. There is some belief in some quarters that many of these materials are being produced in much greater quantities than are reaching the distribution channels. According to these sources, substantial inventories are being built up in anticipation of price relief later and tax relief through the elimination of the excess profits tax, which will take a smaller percentage of profits after the first of the year.

There is a feeling throughout the country that it will be from six months to a year before anything like normal building can be resumed, principally due to the shortage of lumber in the grades and quantities necessary for substantial building and the lack of common labor to produce such items as soil pipe and brick. We found many people doubtful that labor would be available in sufficient numbers in the near future. Many people believe that several million soldiers will take long vacations before attempting to secure jobs. At the present time a major strike is in process on the West Coast which is curtailing the production of Douglas fir, important in the residential building field. Recovery of the construction industry is expected to be quicker in the Southeast, which is the source of approximately half of the cut of soft wood lumber and of approximately two-thirds of soil pipe production. These are materials on which the freight costs are an important consideration, a factor which may be advantageous to builders desiring materials near the point of production.

Some Conclusions

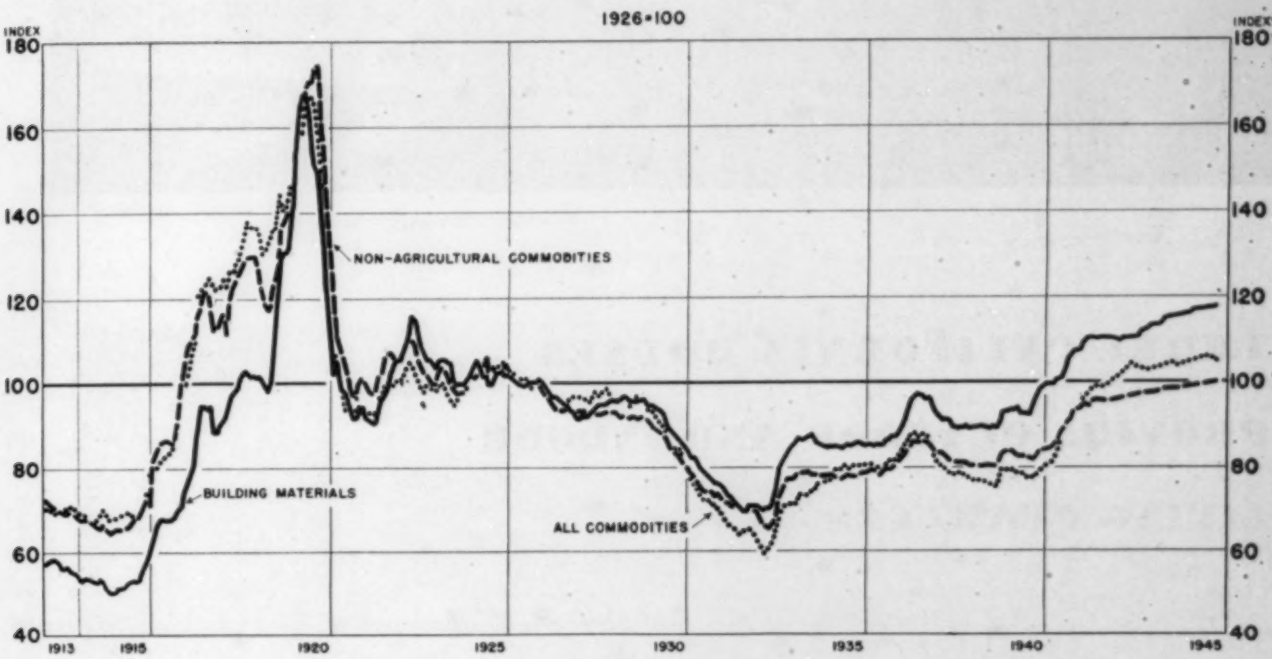
Taking all of these factors together, what conclusions may be drawn? There seems to me to be grave danger of repeating the disastrous experience of the early 1920's, unless cooperation in getting substantial production while holding the price line is continued. At the present time we have all the danger elements of the last postwar period, in magnified form—tremendous pent-up demand for housing, and thus for materials; liquid savings (cash and bonds) to implement the demand; and at least a temporary shortage of materials. Moreover, the general psychology of the people is now tending to be inflationary.

On the other side, however, there are important factors which may be of help. Fortunately, we are at that point in the calendar at which building in the northern and most populous part of the country usually declines. Demands for building materials during the winter thus will be at low ebb by comparison with housing needs, which will continue to be severe. It is to be expected, therefore, that by early spring, when demands for building materials will again pick up, some of the physical problems of reconversion in the manufacture of building materials will have been solved, and great strides will have been made toward the building up of inventories to meet spring demands. As an offset, of course, repairs and remodeling which are less affected by weather may absorb a substantial part of the building materials produced in the coming months.

Prices of building materials in general today are not out of line with prices of other goods, as shown in the chart reproduced below. Over the last thirty years prices of building materials have moved closely with non-agricultural goods in general, and there has been no serious divergence in movement during World War II. This generalization does not apply equally to all materials. Readjustment of building materials prices in general to prices in other fields, therefore, is not a problem, although prices for particular materials will likely face realignment. This problem is important for lumber, which has risen about three-fourths in price since 1939—much more than prices of most other building materials. Since lumber represents an important part of the cost of materials for the average house, such a price discrepancy may have important effects on the construction industry. A tendency to the use of masonry products for exterior walls and insulation board and similar materials for interior walls may be expected if this discrepancy continues. It seems reasonable to assume, however, that relationships will move back toward normal through reduction of lumber prices and increases in prices of other materials, although the readjustment probably will not be accomplished immediately.

WHOLESALE PRICES

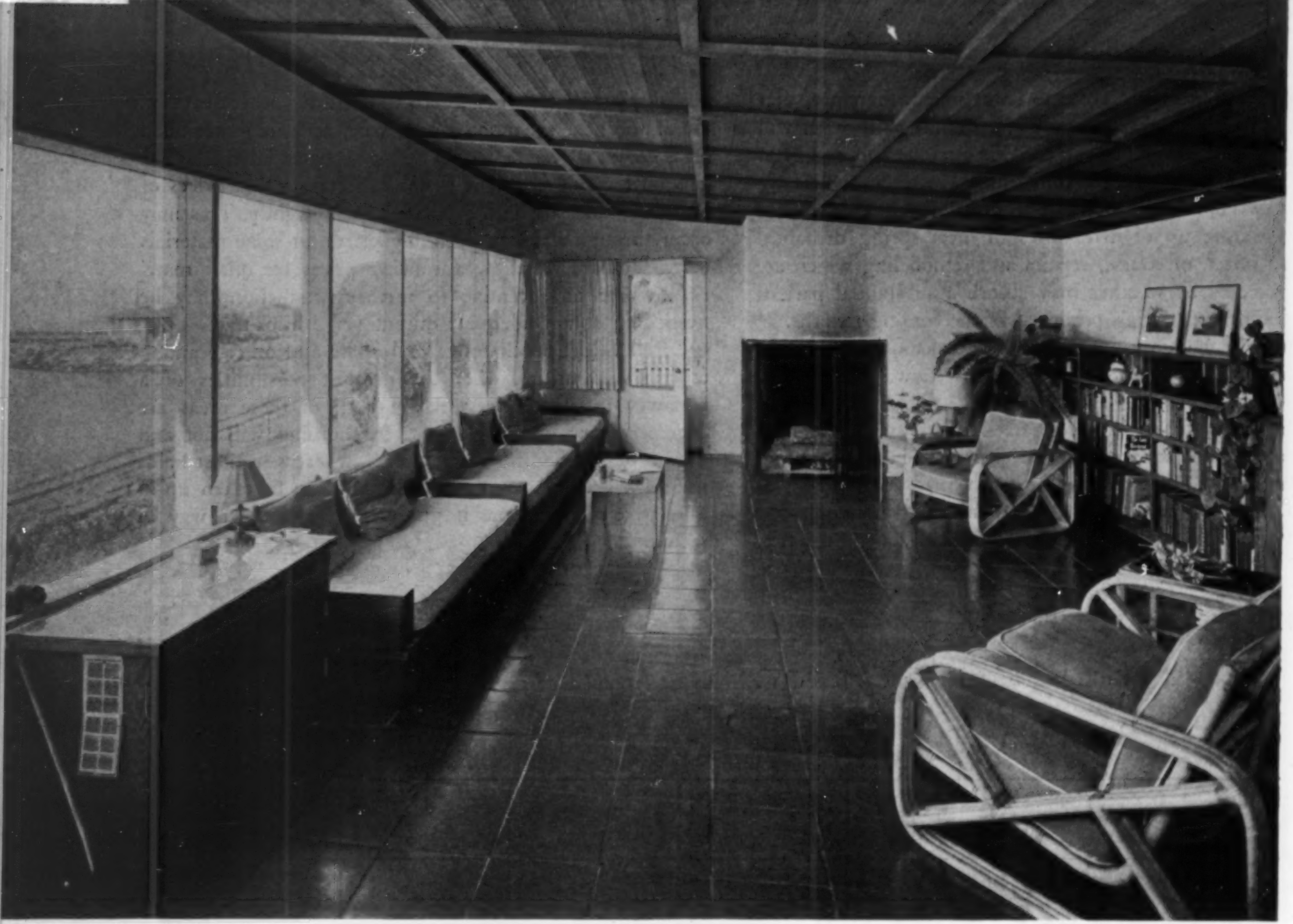
Building materials compared with all commodities and non-agricultural commodities



For the next six months or a year, assuming continued price controls over materials and no substantial rise in the general level of prices, it is our expectation that prices of building materials, as a group, will rise slightly. This may occur through stable or declining prices for some materials (e.g., lumber) offset by advancing prices for other materials where an incentive to further production may be needed to obtain adequate output (e.g., brick).

Of all fields, purchases of real estate and other equities, especially securities, offer the greatest possibilities of a runaway inflation. Pressures in both of these areas are currently very great. Demand for housing will not and cannot be satisfied for several years, whereas in most fields the slack between supply and demand can be taken up in a relatively short time if production gets under way in substantial volume.

Speculation and the tight rental market of recent years already have pushed sales prices of older houses well above long-term values in many areas. A continuation of this tendency or its extension to other areas, continuing speculative pressures in security markets or a further development of inflationary tendencies in commodity purchasing, could defeat our present hopes of reaching a fair equilibrium in the housing field, and might eventually mean a loss of virtually all their savings by millions of families whose equities would be lost in such a tragic collapse as always follows in the wake of a speculative building boom. Surely memories of the early 30's will stimulate the necessary adjustment of our policies to avoid a repetition of that calamity.



Gene Hainlin Studios photos

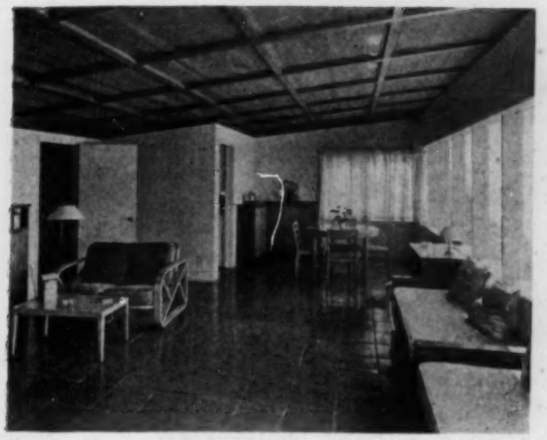
THREE CALIFORNIA HOUSES PROVIDE OUTDOOR AND INDOOR LIVING QUARTERS

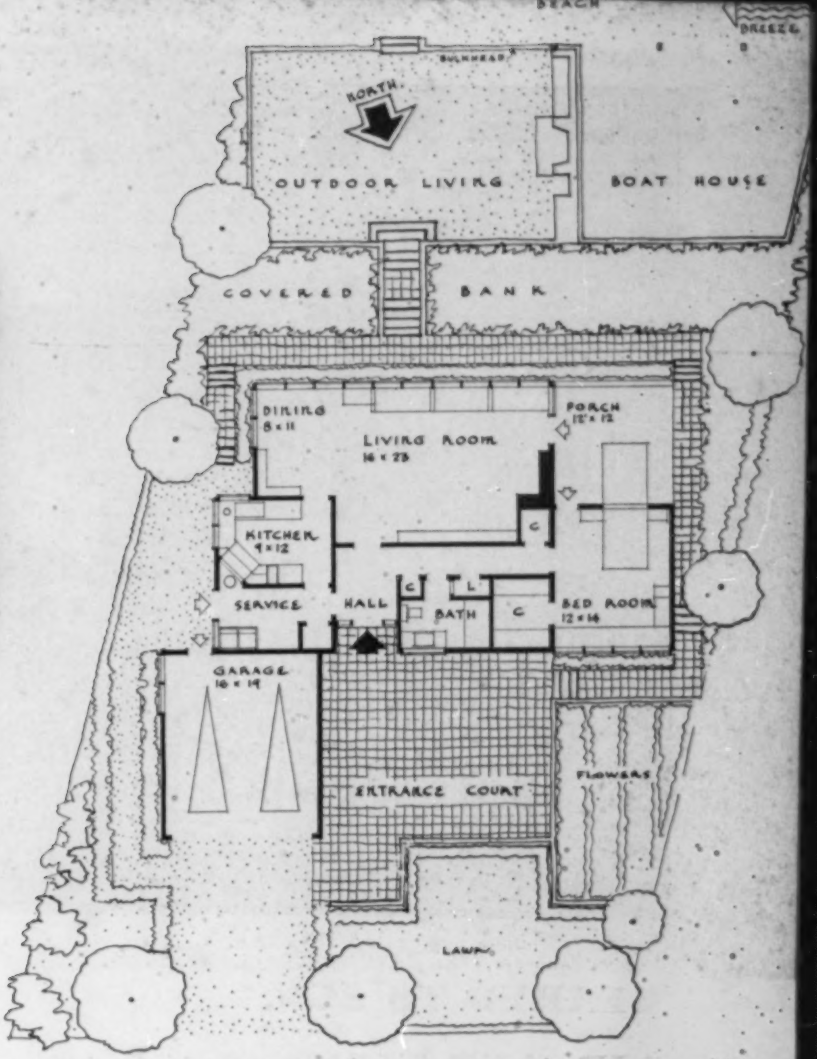
Residence of Mr. and Mrs. W. W. Lawrence, Richmond, California

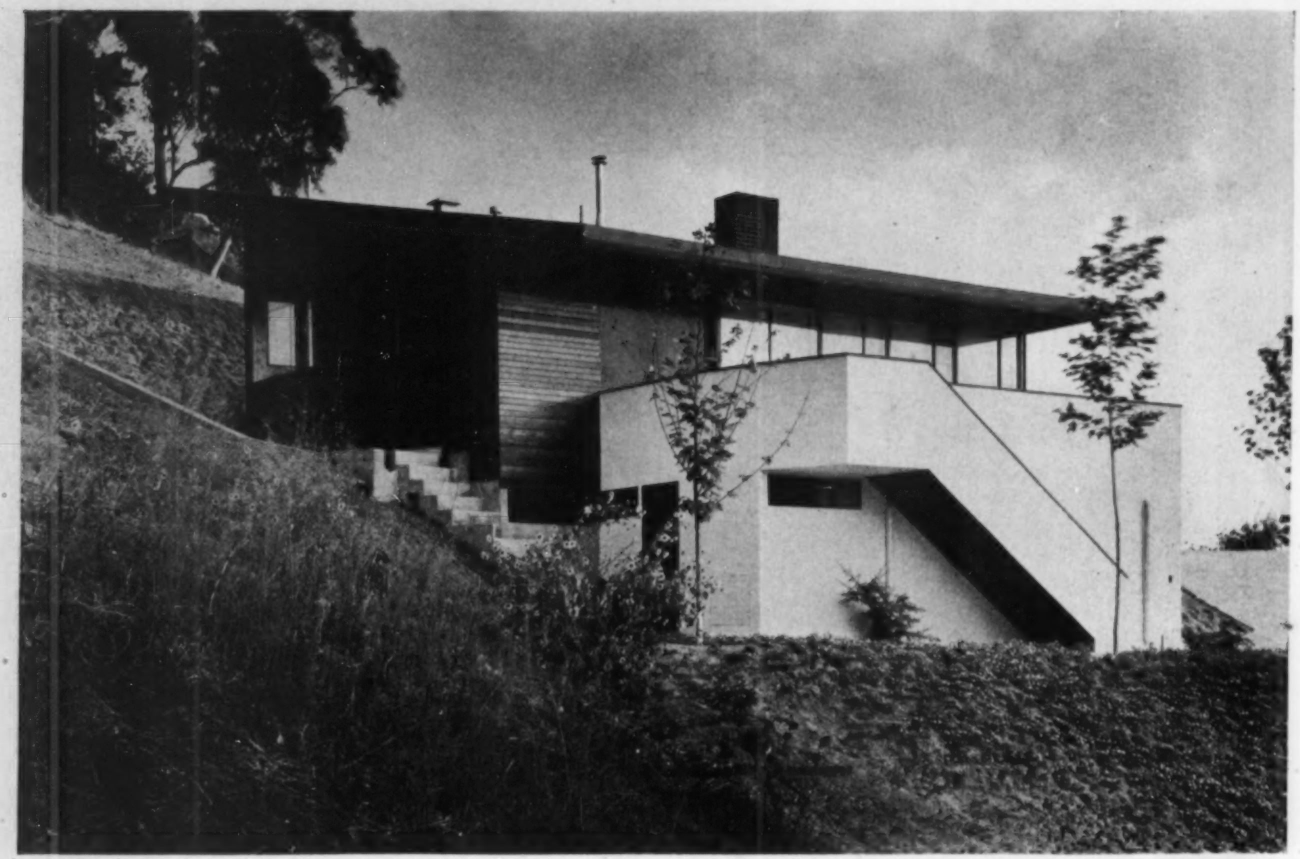
Anderson and Simonds, Architects

THE outdoors is as important as the indoors in California where hillside and waterside sites and well publicized weather abound. Outdoor living areas are planned and placed carefully as important elements of the house, not as an afterthought, and are a far cry from the kind of outdoor life offered by yesterday's front porch of rocking chair memory. They have had as much to do with breaking up the old time rectangular rigidity of the house as any other single factor. Three California houses on these pages show the attention given specific outdoor areas around the house. They are planned to provide facilities for eating as well as lounging, for games, for entertainments; they are placed for specific conditions of sun and shade, wind and weather, view, and season of the year.

The owners of the house on this page bought the lot because its location on San Francisco bay offered fine boating and swimming seven months of the year and cooler weather in summer, warmer weather in winter. The architects were asked to provide a house which would give the owners utmost enjoyment from the bay and beach and afford comfortable and adequate space indoors; only one regular bedroom was required but outdoor sleeping space and arrangements for bunking a week-end overflow were needed. The solution placed the house parallel to the beach rather than to the lot lines and glazed the entire bay side so that living-dining space (and kitchen) get maximum view. The beach terrace on the bay side includes a barbecue fireplace and is sheltered by the cliff behind the house. The wide brick entrance court on the land side of the house, protected by the garage, is recreational space.




BEACH
BREEZE
BULKHEAD
NORTH
OUTDOOR LIVING
BOAT HOUSE
COVERED BANK
DINING 8×11
LIVING ROOM 16×23
PORCH 12'×12
KITCHEN 9×12
C
SERVICE
HALL
C
L
BATH
C
BED ROOM 12×14
GARAGE 16×19
ENTRANCE COURT
FLOWERS
LAWN
0 5 10 15 20 30



Luckhaus Studio photos

GEARED TO SUN, AIR, AND VIEW

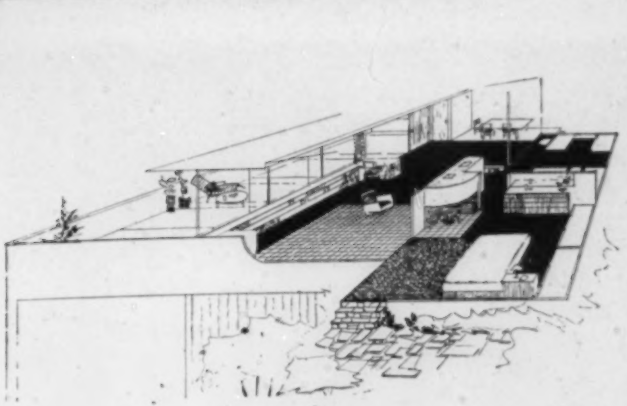
Residence of Mr. and Mrs. Ted Bonnet, Hollywood, California

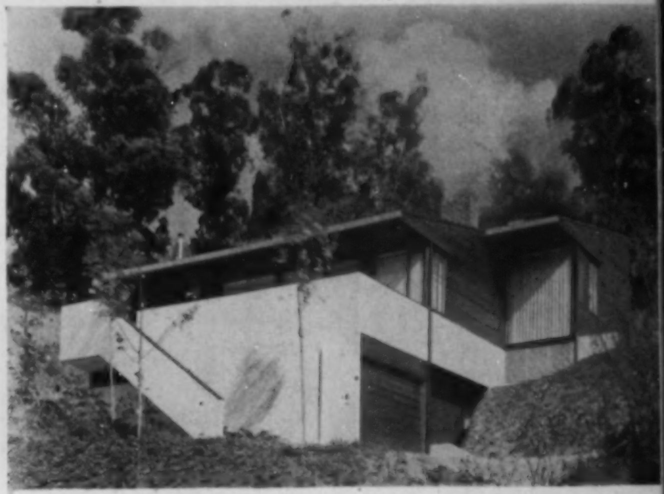
Richard J. Neutra, Architect

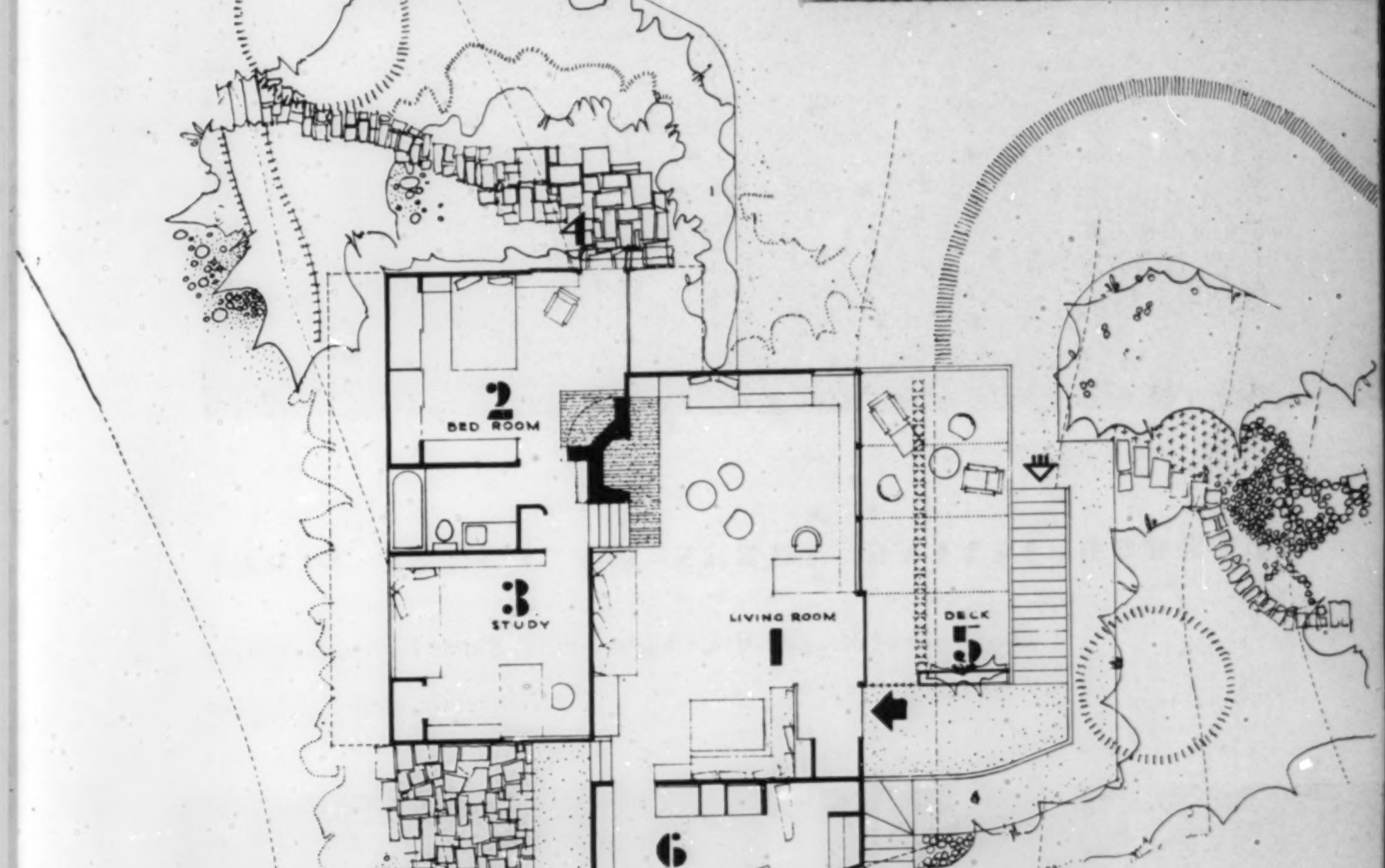
THERE are outdoor living quarters on three sides of this redwood and cement house to suit the time of day and various needs of the occupants. An open deck across the west side of the house is built high enough to catch fully the northwest mountain view and include a garage below the deck, a secluded terrace off the master bedroom looks towards plains and sea to the south, and a rear patio behind the living room is a protected area shielded by the house and the steep, tree lined slope above it.

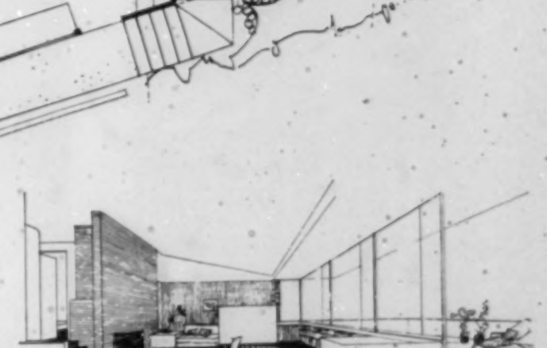
The hillside site placed the living quarters on three levels; garage and future service space are at ground level at the front, living room and kitchen are overhead, bedrooms and bath are on still another level, more secluded and quiet because they are five steps removed from the living room and at the rear of the house. Stretching across most of the house width, the living room is separated from the open deck only by fixed glass panels and a sliding glass door, bringing indoors and out together in pleasant combination. General living space centers around the fireplace which, with a simple opening and no mantel, extends as a wide brick wall from the floor to the sloping ceiling. The short stair to the bedroom level is made an interesting part of this fireplace design. Dining facilities are taken care of by a built in L shaped sofa and table.

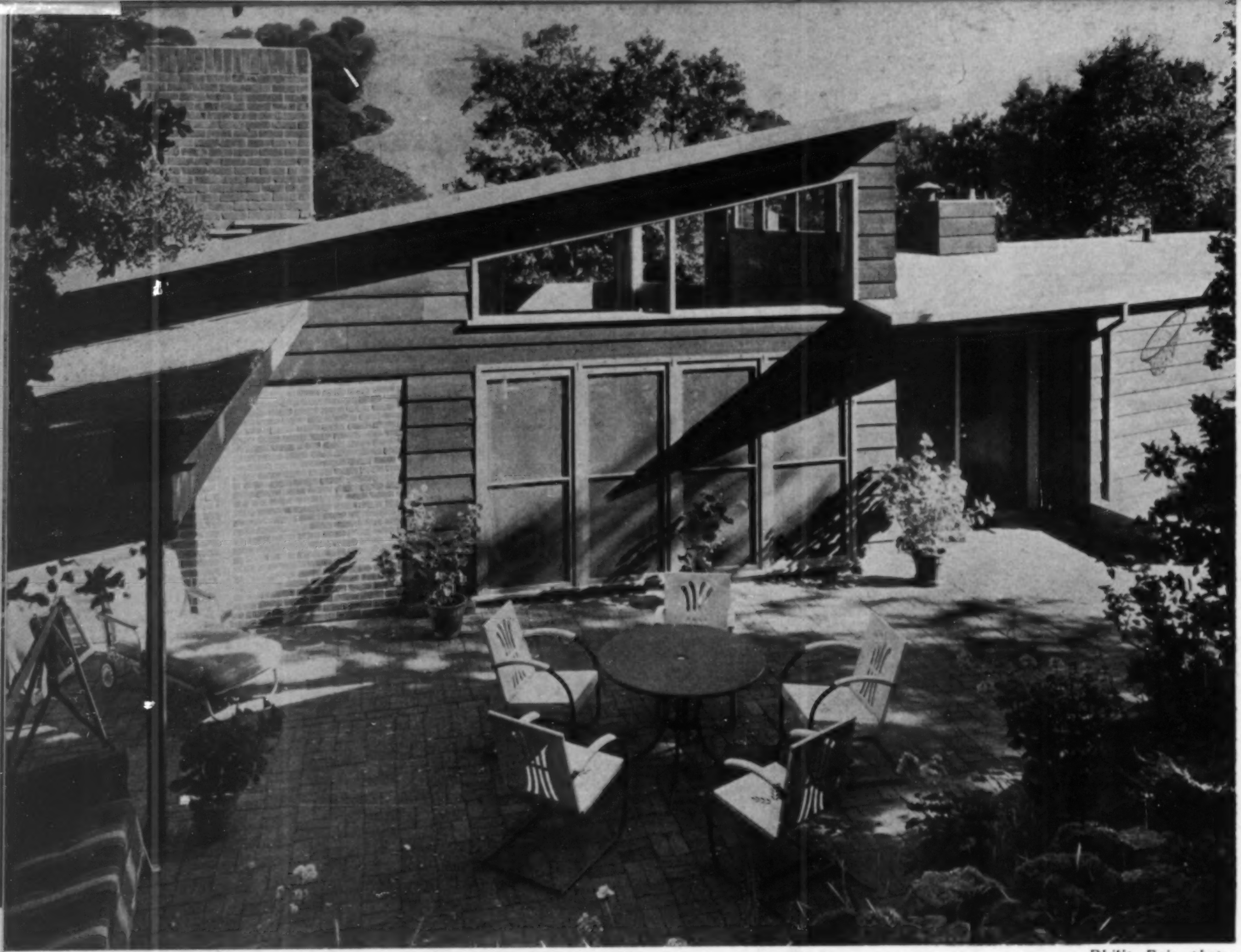
Julius Shulman






2
BED ROOM
3
STUDY
LIVING ROOM
1
DECK
5
6
4



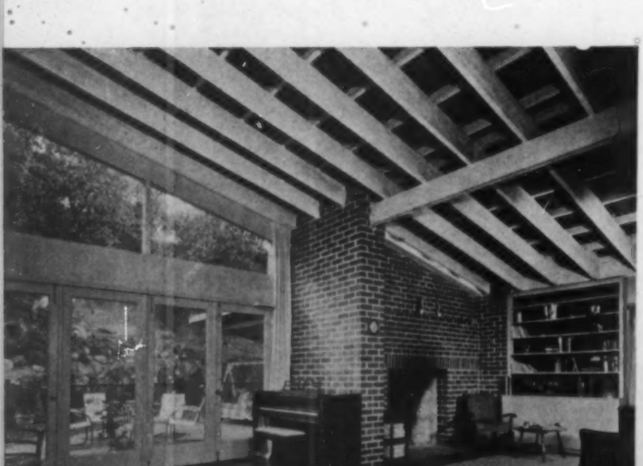


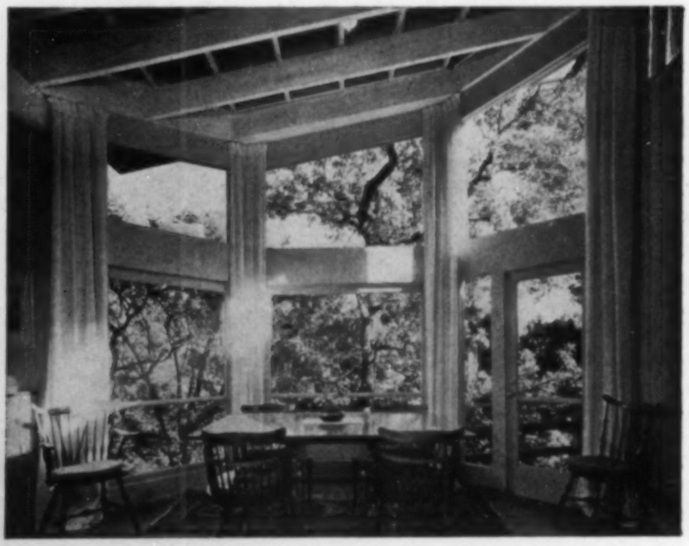
Philip Fein photos

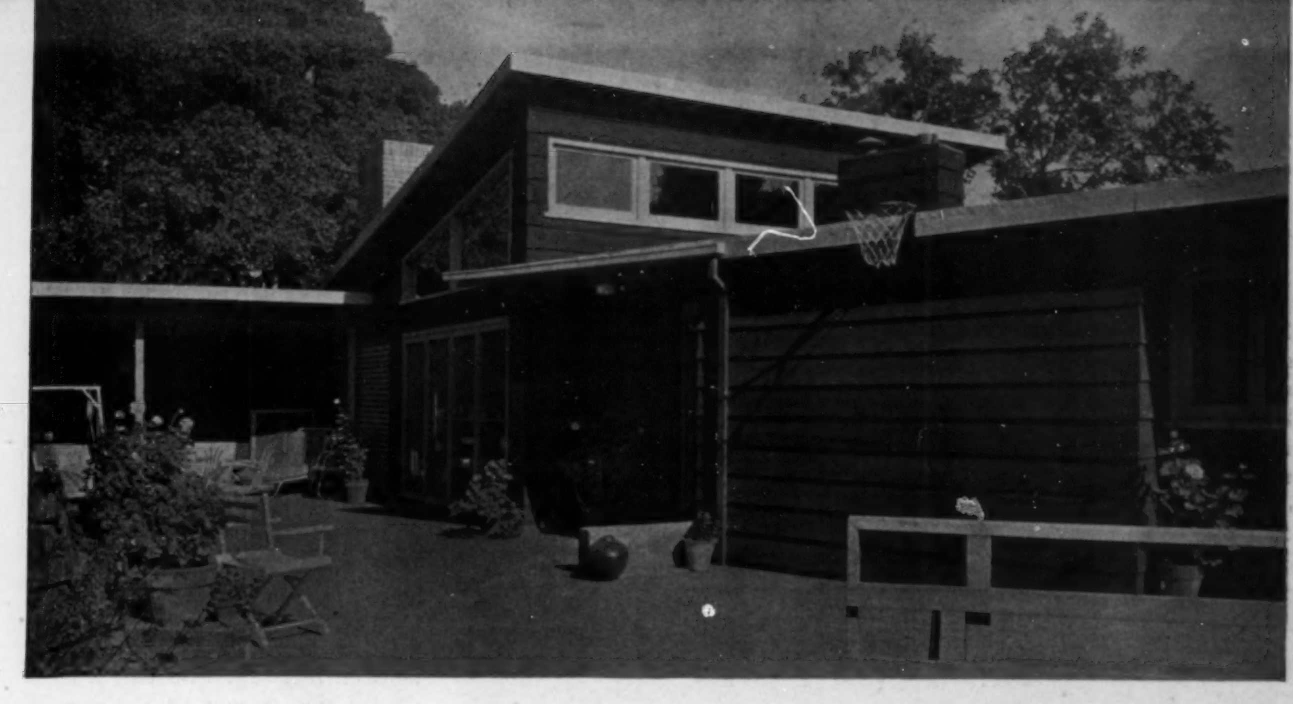
OUTDOOR LIVING AREAS ON THREE SIDES

Residence of Mr. and Mrs. Charles Smith, Releiz Valley, California

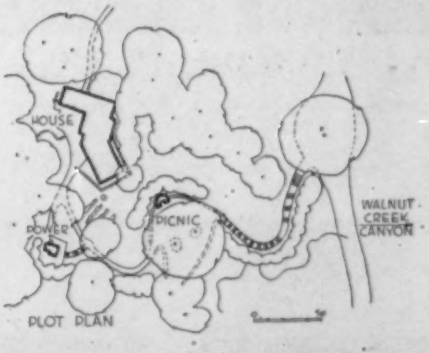
Michael Goodman, Architect

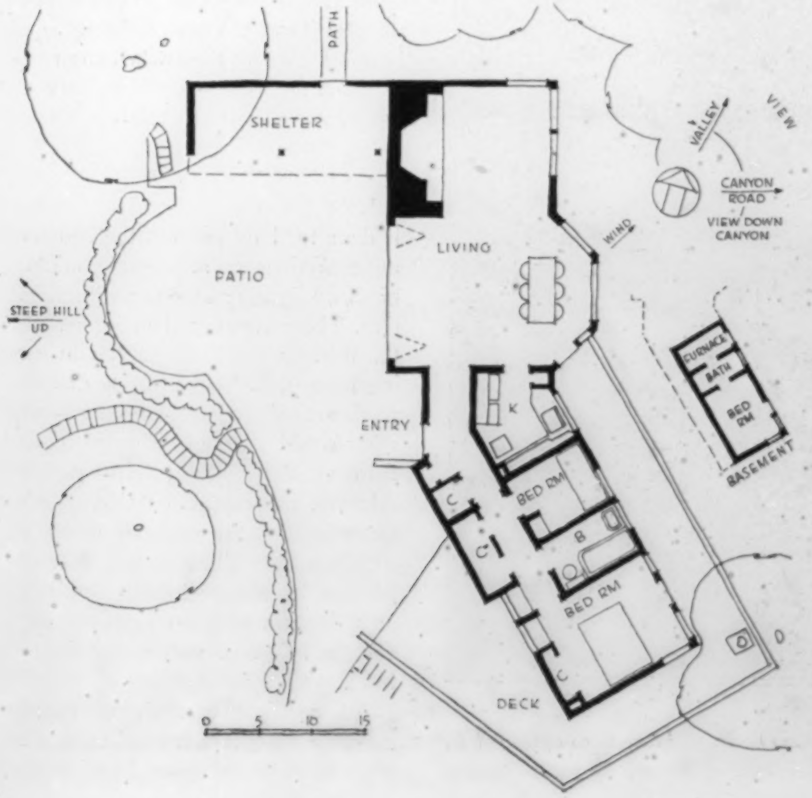






A GLANCE at this house plan shows quickly the generous provision it makes for the outdoor activity its fine setting demands. There is nearly as much living space outdoors as indoors. An open, wood-floored deck, carried around three sides of the extended one-story wing like a ship's forward deck, gives the bedrooms an individual terrace looking down the canyon—a good spot for seclusion with a book. On the other side of the house, a wide spreading, irregular shaped, brick paved patio, is sheltered by a steep hill and the story and a half, shed-roofed living room wing; it forms an exceptionally inviting entrance court and serves as general space for entertainment, doubling the actual size of the indoor living room by means of wide, glass connecting doors. It is large enough to include space and equipment for basketball practice and also a loggia affording the cover necessary on occasion. Indoors, every advantage is taken of the splendid views by large, fixed glass on four sides of the living room.


HOUSE
POWER
PICNIC
WALNUT CREEK CANYON
PLOT PLAN


PATH
SHELTER
LIVING
PATIO
STEEP HILL UP
VALLEY
VIEW
CANYON ROAD
VIEW DOWN CANYON
WIND
ENTRY
K
FURNACE
BATH
BED RM
BASEMENT
BED RM
C
C
B
BED RM
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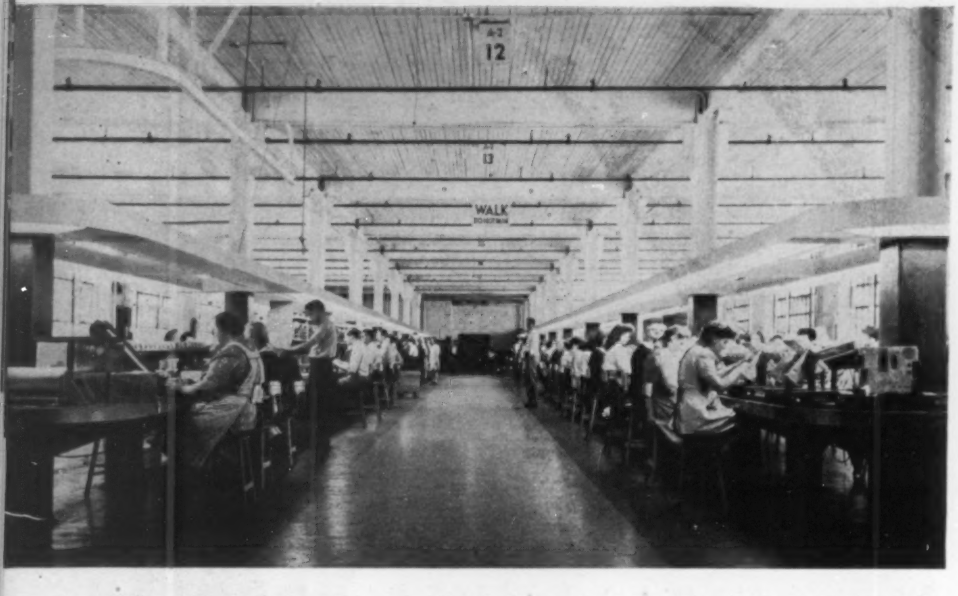
D
DECK
0
5
10
15

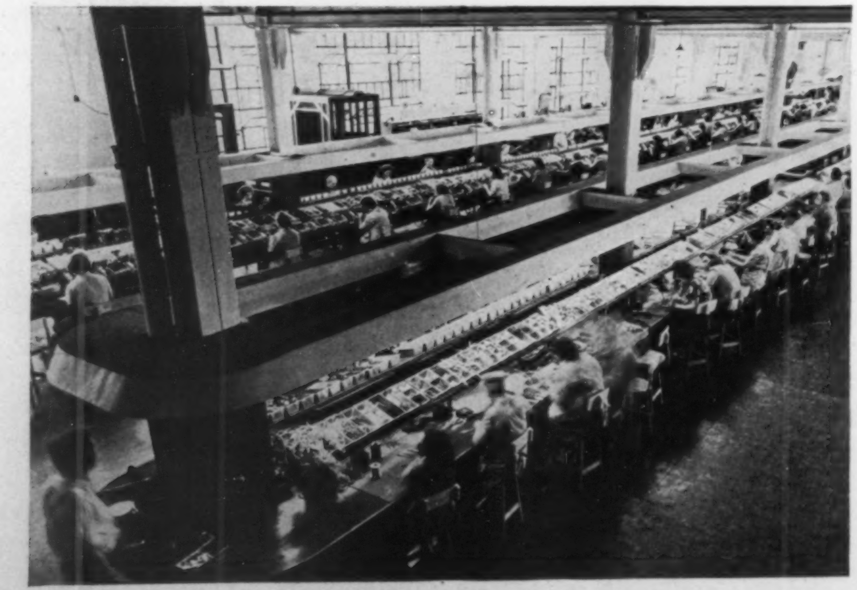
DESIGNING WITH FLUORESCENT LIGHTING

By Dr. Matthew Luckiesh

11. Architects and industrial designers in cooperation with lighting specialists have new and almost unlimited possibilities in tailoring lighting and lighting equipment to fit the work-areas in systematic routings of work. Notwithstanding the limitations imposed by the war, some promising steps have been made in this direction. Fig. 11 illustrates one of these which should have both technical and esthetic appeal for architects and designers. Light can be properly supplied to the critical tasks of seeing both in quantity and in direction or distribution. It is easy to obtain 100 footcandles or more upon the visual tasks. When this localized lighting is provided by luminous strips above the eye-level, care must be exercised in not having too much light on the eyes of the workers. Footcandles on the work rather than on the eyes is the goal. There is no inherent objection to wearing visors, if necessary, but the challenge is to provide adequate light on the work with only a fraction of this amount on the eyes of the workers. Careful drawings of vertical sections will reveal what must be done in this respect.



11. *For critical seeing tasks the challenge is to provide plenty of light on the work with a minimum on the eyes of the worker—quantity of light is easy*



12. *In this installation (same one shown above) the problem is complicated by the double assembly line; workers must face light from the opposite fixtures*

12. Another view of the same installation is shown in Fig. 12. This installation was planned by A. H. Girard, chief designer and architect, in cooperation with industrial engineers and production experts of the International Detrola Corporation. A minimum of 60 footcandles is supplied on the work. This is a good example of planned lighting for assembly lines. When two rows of workers face each other, the problem of obtaining glareless lighting may be more difficult than when the rows of workers face the same direction.

13. When extremely critical seeing is done for long periods, the best seeing conditions are achieved by adding localized lighting to general illumination. There are several major reasons for this. Extensive researches in seeing have proved conclusively that the work area should be as bright as any other sizable area in the entire visual field of the worker. This can be achieved in practice by adding adequate light to the work by means of supplementary illumination. The latter can be obtained from spotlights at a distance or from supplementary fixtures below or well above the eye level.

An excellent example of supplementary illumination is illustrated in Fig. 13. The localized light is fur-

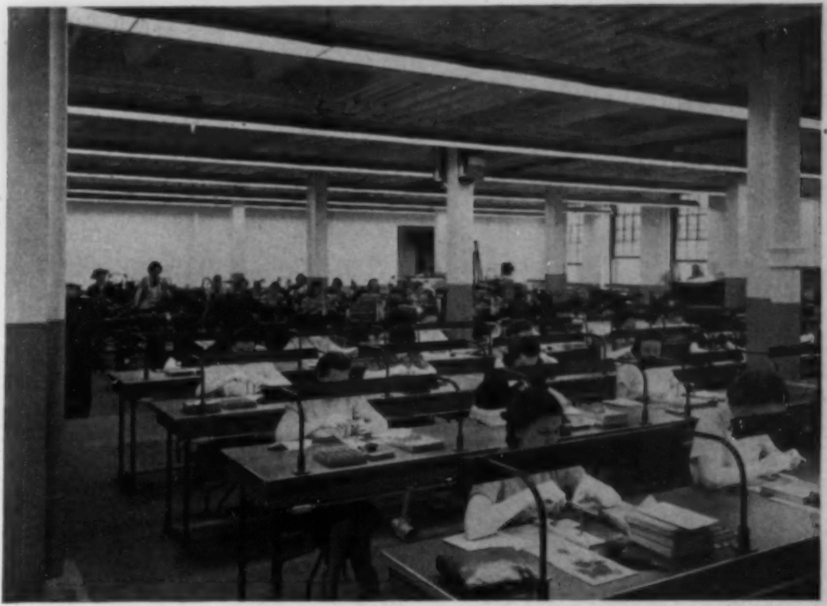
Director, Lighting Research Laboratory, Nela Park, Cleveland

nished by fluorescent lamps in opaque reflectors below the eye level. These sources of low brightness reduce the annoyance of specular reflection from polished objects. Owing to the length of these sources, there are no harsh shadows. Where harsh shadows aid in seeing, filament lamps are more desirable. However, fluorescent lamps are generally desirable as sources of supplementary illumination.

In such an installation as illustrated in Fig. 13, it is easy to obtain 100 to 500 footcandles on the work. The general lighting system can readily supply 50 footcandles everywhere on the horizontal work plane if there are enough luminous strips. The supplementary lighting can readily provide several hundred footcandles efficiently and effectively.

14-15. Polished objects, such as metallic ones, reflect more or less perfect images of light-sources and luminous areas. These images are often annoying. They reduce visibility and produce eyestrain and discomfort. To study lighting from this viewpoint one must have a work's eye view of the light sources and luminous areas. To reduce the annoyance of specular reflection one must reduce the brightness and increase the size of the overhead luminous areas. Supplementary light properly directed can avoid or utilize specular reflection. However, supplementary lighting should be added to general lighting. Localized light should not be used alone with the remainder of the room relatively dark.

In Fig. 14 is illustrated a supplementary fixture which makes it possible for the worker to orient the object to avoid or to utilize specular reflection. In Fig. 15 the worker uses supplementary light in order to see very fine objects by means of the specular highlights. She wisely uses a white background for silhouetting the fine objects. In general the brightness of the surroundings should be nearly that of the task. When the brightness-ratio is too high, eyestrain and discomfort are increased.

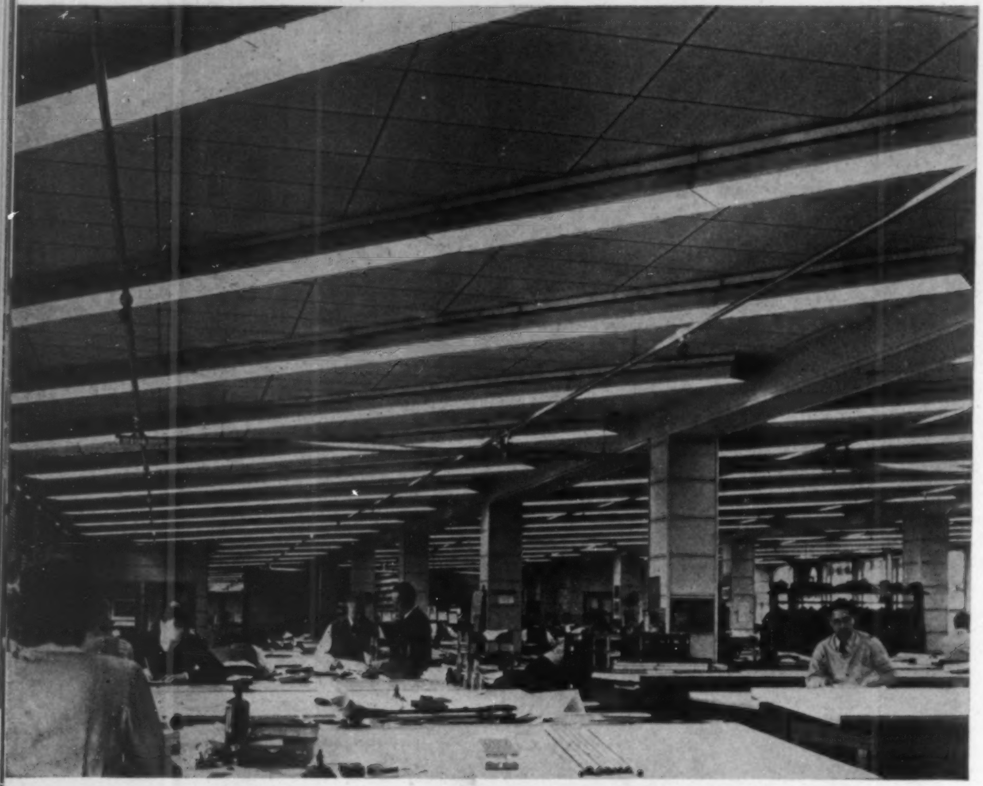


13. *For extremely critical seeing tasks it is good practice to add localized lighting to the general lighting. Long fluorescent fixtures are usually good*

14-15. *With good supplemental lighting the worker can either utilize or avoid specular reflections from polished objects. White background increases visibility*

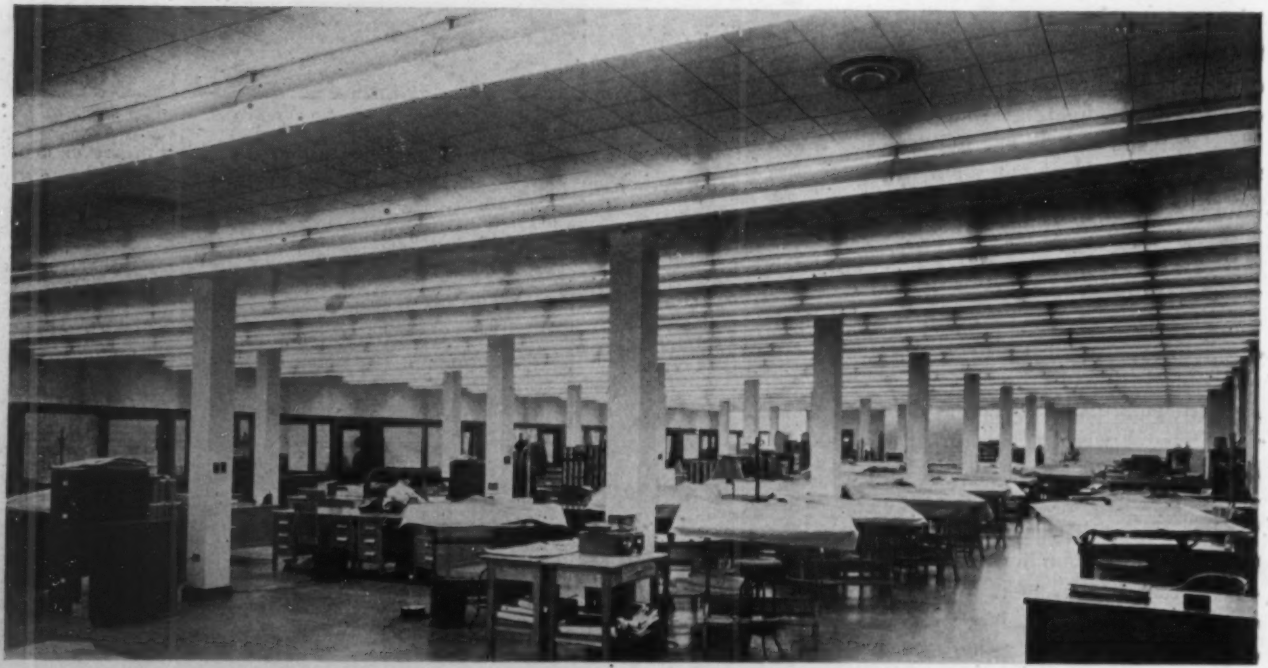
Lighting the Drafting Room

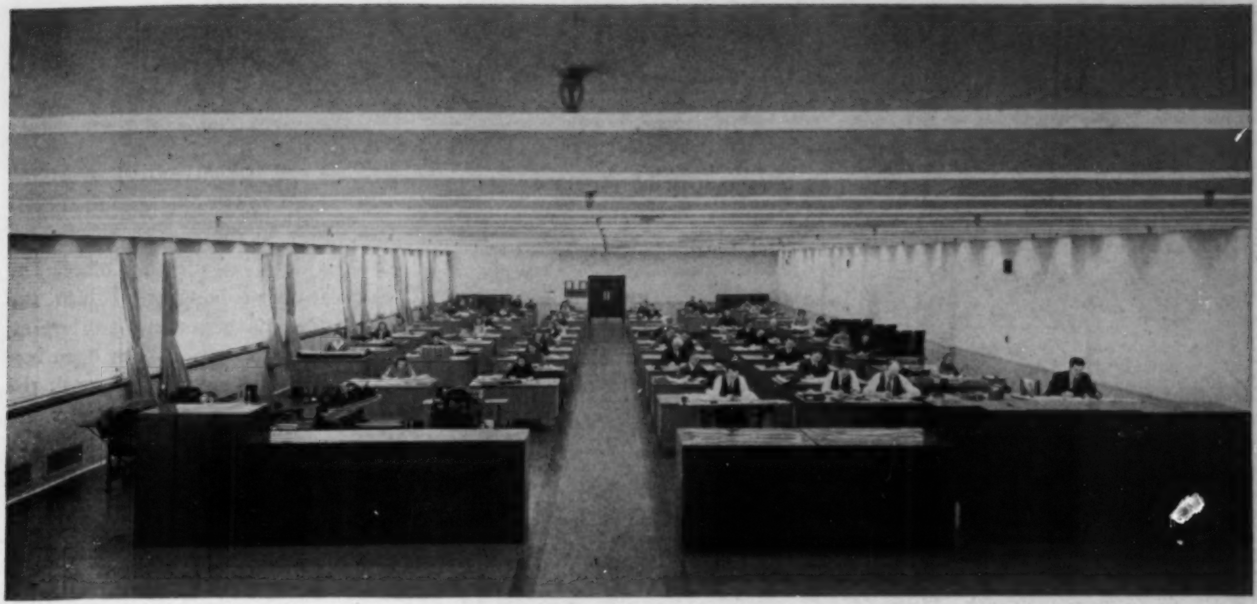
16-17. Fig. 16 illustrates a simple solution of the problem of shadows in the drafting room. The long strips of luminous fixtures are installed at an angle of 45 degrees with the walls. This practically eliminates annoying shadows of drafting tools in any position of the boards or of the draftsmen. Of course, the fixtures can be located in the usual manner perpendicular to the walls and the individual drafting tables can be placed diagonally in relation to the sides of the room. However, in large crowded rooms there appears to be some advantage in the diagonal installation of the fixtures. In the case illustrated, the illumination on the horizontal work plane is 80 footcandles. Measurements of visibility of blueprints and similar visual tasks indicate that 100 footcandles is a moderate level of illumination. Such tasks should be illuminated to levels several times greater than tasks of reading black print on white paper if comparable visibilities are to be obtained. In Fig. 17 is shown the same fluorescent lighting fixtures as in Fig. 16 installed in the conventional manner. The drafting tables are located diagonally. Possibly the over-all appearance of the room is more satisfactory than the preceding one.



16. *Fixtures placed diagonally minimize shadows across drafting boards for the Willamette Iron and Steel Shipbuilding Co. Photo courtesy Edwin F. Guth Co.*

17. *In this drafting room the fixtures are hung conventionally, but tables are placed diagonally, for almost shadowless lighting. (Reed Roller Bit Co., Houston)*





18. *Fluorescent lighting in strips recessed in the ceiling gives Otis Elevator workers good seeing conditions, without the usual clutter of hung fixtures*

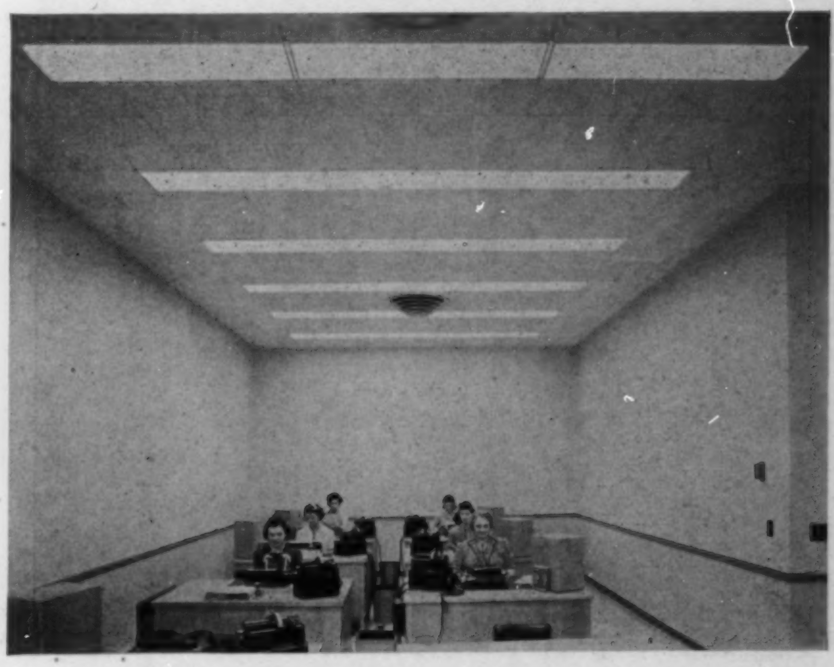
Trends in Lighting Offices

18. In offices critical tasks of seeing are performed for long periods daily. These tasks vary widely in visibility from pencil notes, duplicated copies by various processes, and well printed matter. They may lie flat on the desk or they may be vertical in front of the typist. Furthermore, as in other places in the work-world, the eyesight of the workers varies from normal to various degrees of subnormality. Light is the leveler of eyesights and of tasks. The practical solution is to supply adequate light for subnormal vision and for the tasks of low visibility.

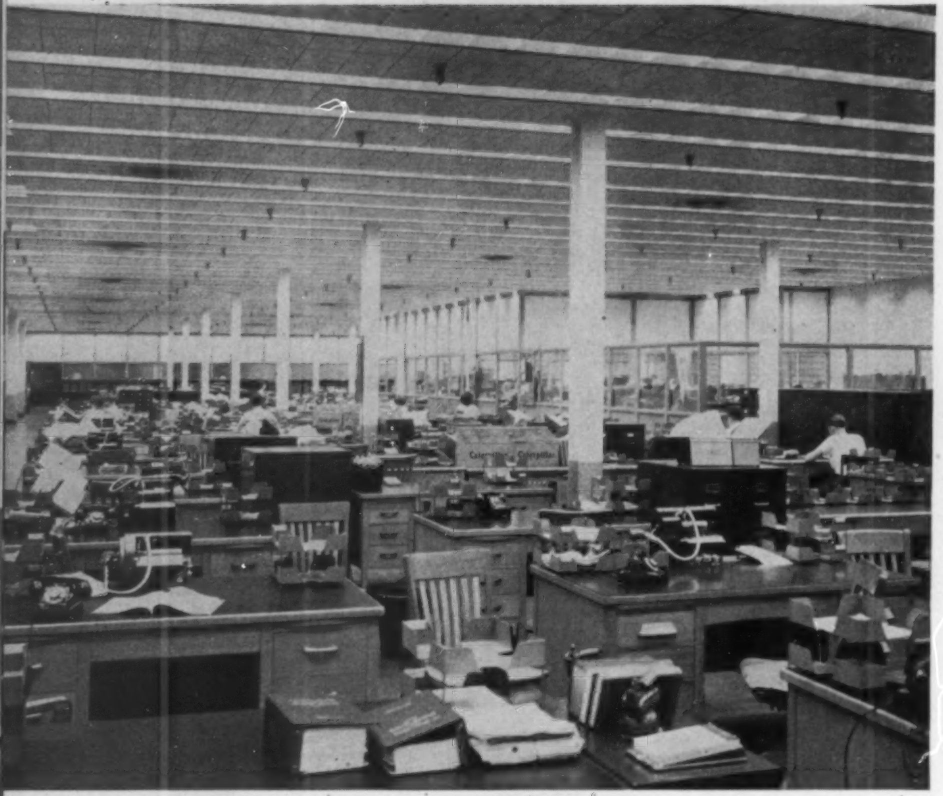
At present with fluorescent lighting the general level of illumination which is being aimed at in offices is 50 footcandles. It can be shown that this is a moderate level still far below the ideal level for highest visibility and easiest seeing of the tasks found in offices.

In a large general office fluorescent lamps provide a practical solution by means of general lighting. For example, Fig. 18 illustrates the use of luminous strips flush with the ceiling. It is easy to obtain 50 footcandles in this manner with a fair degree of comfortable seeing. The pleasure of being emancipated from the traditional clutter of a hanging forest of fixtures can be felt even by merely looking at the illustration. This is an excellent example of progress toward freedom from the past and to the endless opportunities for the architect of the future.

19. Fig. 19 illustrates a small office with built-in lighting areas and the proper use of paint and other finishes. The combination results in a luminous interior in which there are no harsh brightness-ratios in the normal visual field of the workers. Here a great step has been taken toward the ideal in comfortable seeing conditions. The resulting environment is a vast improvement over most work conditions. It is obtained by wisely combining lighting, painting, furnishing and finishing.



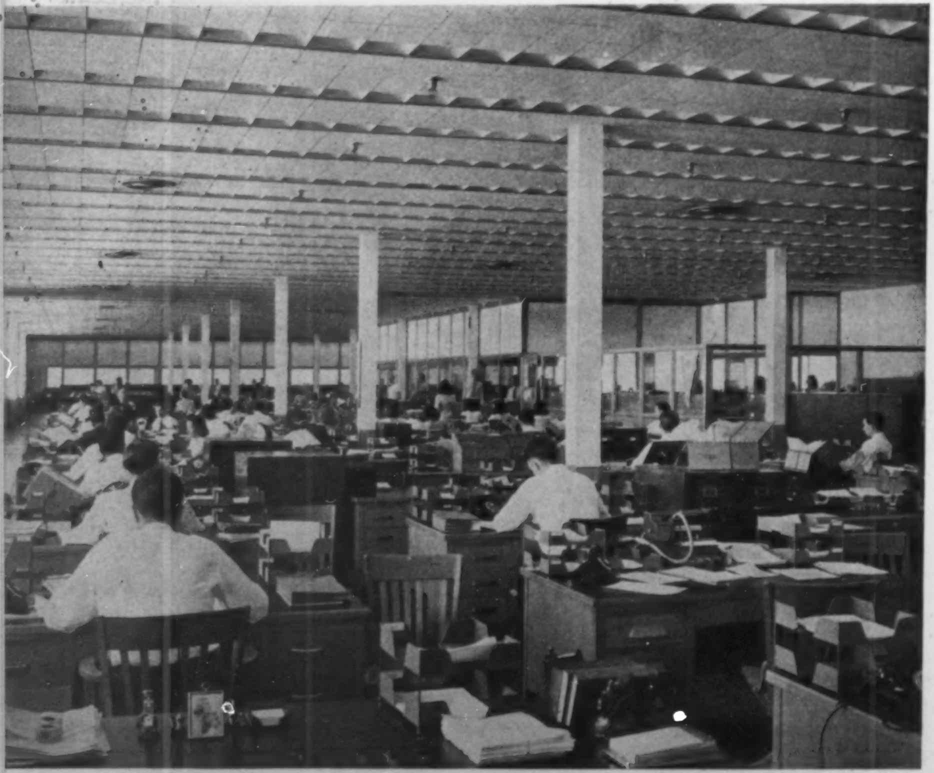
19. *An unusually good combination of lighting, painting, furnishings and finishing to produce a luminous interior. (Courtesy National Gypsum Co.)*



20. *Night view of Caterpillar Tractor Co. offices, Peoria. Adequate, even lighting from open troffers, with baffles, aluminum finished, recessed in ceiling*

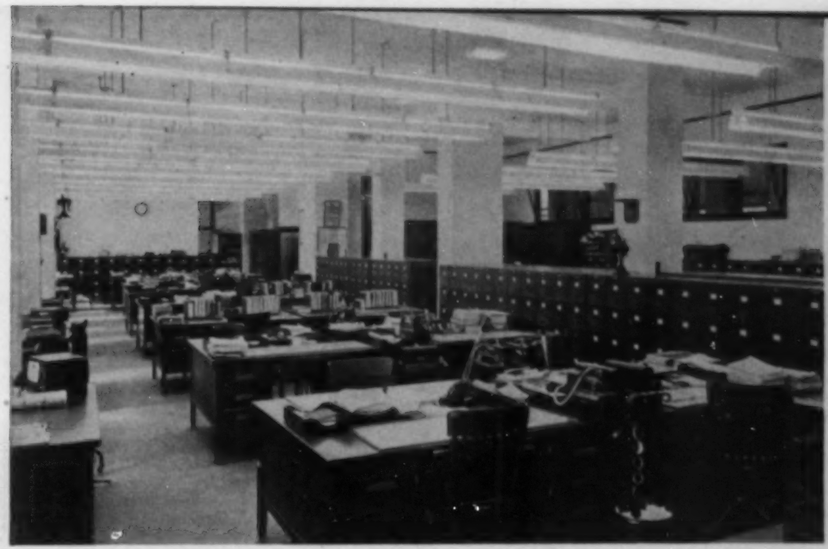
20. Fig. 20 illustrates what can be done in the usual crowded office. The elimination of hanging fixtures immediately contributes to an impression of less congestion. The open bottom of the troffers is flush with the ceiling. The inside of the troffers and the surfaces of the fixed baffles or louvers are of aluminum finish. This reduces the brightness of the troffer as seen at a distance. The over-all effect is quite satisfying and the result is comfortable lighting. It is a relatively simple matter to obtain 50 footcandles at the work level by this method. The illustration conveys something of the impression of the seeing conditions which are great improvements over those of the past.

21. *Daylighted view of same office (above). The author points out that the troffers do not look much brighter at night than when the lights are out, by day*



21. Fig. 21 illustrates a daylight view of the same interior. Actually, the portion of the troffer which appears brightest in Fig. 20 is of comparable brightness in Fig. 21 when there is no artificial light. For a long time artificial lighting has more than met the challenge of daylighting. With the advent of fluorescent lighting, windows more and more perform the function of "letting vision out." As the levels of artificial illumination continue to rise toward the high levels of ideal lighting for critical seeing, daylighting will be more and more incidental. The windowless interior can be eminently satisfactory from the viewpoint of performing critical seeing with ease and comfort. Where they are practicable, windows are justifiable in letting vision out. They are still a part of the new luminous era wherever they are not too wasteful of space. The cost of daylight involves many factors besides the cost of windows. The value of letting vision out warrants study.

22. In Fig. 22 is illustrated a fairly inconspicuous fixture which is partially luminous but for the most part provides indirect lighting. This provides a practical solution for many offices in the work-world.



22. *A good approximation of indirect lighting, from fairly inconspicuous hung fixtures which allow some of the light to leak out to illuminate the ceiling*

Footcandles for Various Tasks

In the foregoing discussion seeing conditions have been emphasized more than seeing. The illustrations have been used primarily for this purpose and for suggesting opportunities for the architect and industrial designer. Comfortable and easy seeing have been discussed ahead of levels of illumination. This has been done for the reason that there have been many misuses of fluorescent lamps resulting in glare and discomfort. However, even when the brightness distribution in the entire visual field is such that there are no inordinately high brightnesses or high brightness-ratios, the footcandles at the work are primarily important. They should be supplied according to the task involved. Seeing cannot be easy or comfortable without adequate light on the specific task.

Much progress has been made toward the scientific specification of footcandles. In fact, it is possible to measure the visibility of details of any visual task and to specify the footcandles necessary to elevate the task to any given visibility-level. This method is the only available sound basis of footcandle recommendations for various types of work or visual tasks. A few examples will suffice to reveal the great difference in footcandle requirements among visual tasks to make them equally visible.

In order to make the following tasks equal in visibility to that of the printed matter on this page when there are 50 footcandles on this page, the following tasks must be illuminated by the footcandle indicated: pencil notes, 100; newspaper text matter, 150; small details in drafting, 200; small print on yellow pages of telephone directory, 250; newspaper stock quotations, 350; white thread on white crepe cloth, 500; black thread on dark cloth, 2000 footcandles. These values are approximate, for it is impossible to describe these tasks accurately as to details. However, they give an idea of the inadequacy of 50 footcandles for many tasks.

In order to understand why different tasks differ greatly in visibility under the same level of illumination, one must think in terms of brightness of the task and not merely of footcandles. Tasks differ greatly in reflection-factor, as for example, white paper and black cloth. One must also think in terms of the brightness-contrast between the critical details of a task and their background. The printed matter on this white page has a high contrast with its background. A dark thread on dark cloth has a low contrast. For these two reasons the latter requires much more light than this printed matter to be at the same visibility-level.

In closing, let us briefly consider the maximum amount of light which is desirable solely from the viewpoint of easiest seeing. This is determined by the brightness of the task when the other characteristics of the task remain constant. There is considerable direct and indirect evidence that the ideal level of illumination for reading this page is somewhere in the region of 350 footcandles. The brightness of this printed page, which has a reflection-factor of about 70 per cent, would be about 250 footlamberts when illuminated to 350 footcandles. (If the page diffusely reflected 100 per cent of the incident light, its brightness would be 350 footlamberts.) A green grass lawn outdoors during midday has a brightness of this order of magnitude. These are comfortable brightnesses if the lighting is done without any preventable glare.

Now consider sewing on dark goods which diffusely reflects only about 7.1 per cent of the incident light. Ten times as much light is necessary to make the dark goods as bright as this page. In other words, 2500 footcandles makes the dark goods of the same brightness as this page would be if it were illuminated by 250 footcandles. At a large window exposed to a large expanse of sky, one may commonly measure 250 footcandles. At these respective levels of illumination these visual tasks would approach the highest practicable visibility-level.

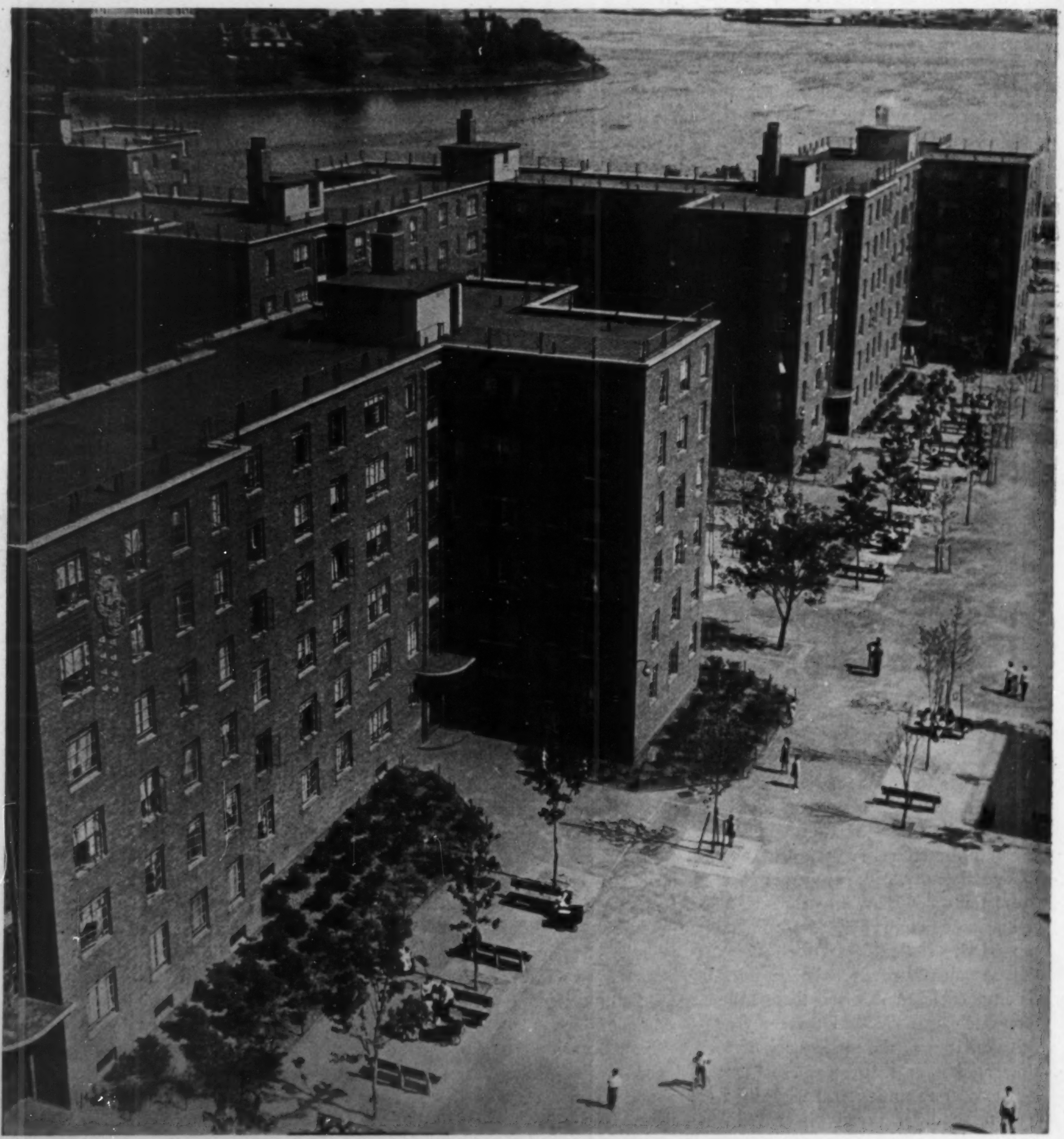
Incidentally, let us assume that a person with average normal (20/20) vision were reading this page under a level of illumination of 40 footcandles. The printed matter would be at a certain visibility-level for this person with average normal vision. However, in order for the printed matter to have the same visibility-level for a person with 20/40 vision, this page would have to be illuminated to a level of 100 footcandles.

These are glimpses of the importance of footcandles on the specific visual task. This article has been devoted primarily to fluorescent lighting for comfortable seeing, which is determined by the brightnesses and brightness-ratios in the visual field. However, ease of seeing also involves the specific visual task and the footcandles supplied to it. This aspect of lighting in the work-world is a matter for the specialist who is thoroughly familiar with the relationships of light, vision and seeing. With standard fluorescent lamps, varying in length from a few inches to eight feet, added to the variety of available filament lamps, we are now really rich in lighting tools. Poor seeing conditions should rapidly become obsolete.

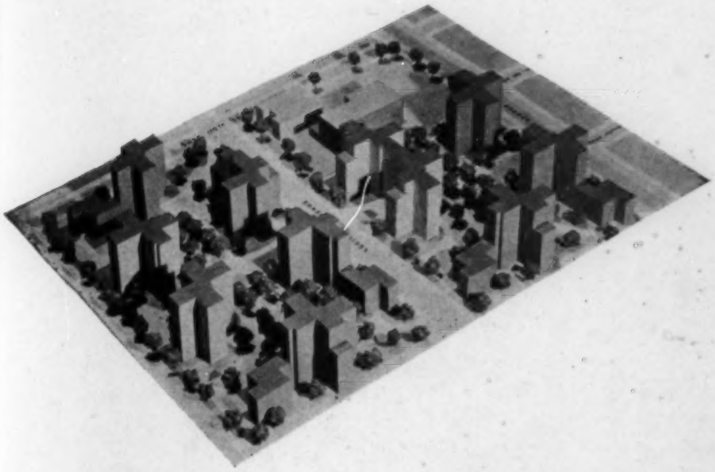
LOW-RENT APARTMENTS

EFFICIENCY in construction, elevators, heating

ARCHITECTURAL RECORD'S BUILDING TYPES STUDY NUMBER 109



for a special problem



LILLIAN WALD APARTMENTS

A Building Types Study Guinea Pig
Frederick L. Ackerman, Lafayette Goldstone, Architects

ELEVATOR EFFICIENCY

is based on cost, capacity, and speed
By Sullivan A. S. Paterno, Consulting Engineer

EFFICIENT STRUCTURE

invokes the principle of continuity
By Fred N. Severud, Structural Engineer

EFFICIENT HEATING

takes many new forms in apartments

LOW-RENT APARTMENTS OF MINIMUM HEIGHT

George Washington Carver Apartments, Chicago
Skidmore, Owings and Merrill, Architects and Engineers

THE stringency of the housing need of the next ten years needs no further discussion. Design methods must be adapted to the stringent situation of the present moment no less than production methods. Every brick, every reinforcing bar, every elevator must be so disposed that it can do the most efficient possible work.

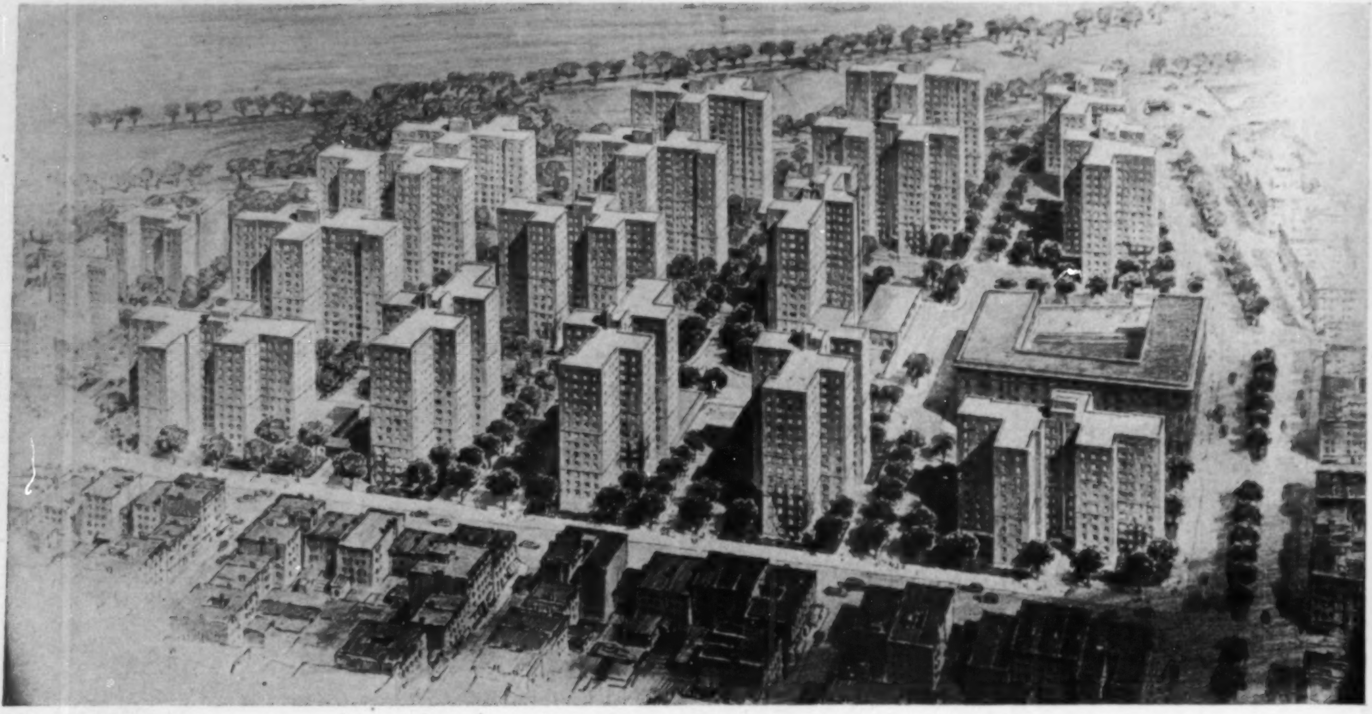
In particular there are opportunities for new efficiency and economy in tall apartment buildings. Elevator apartments used to be luxury accommodations. Their employment at low rentals is relatively new. At about the beginning of the European war, the public housing program in New York began to use expensive land requiring as many as 400 people per acre to meet the cost. In some of the subsequent insurance-financed projects the density, figured in the same way, approaches 600 people per net acre.

Whether or not such land policies are wise is not our direct concern in the present building types study. What we are concerned with is the fact that technical analysis had been skimpy in this field of action, and needs amplification.

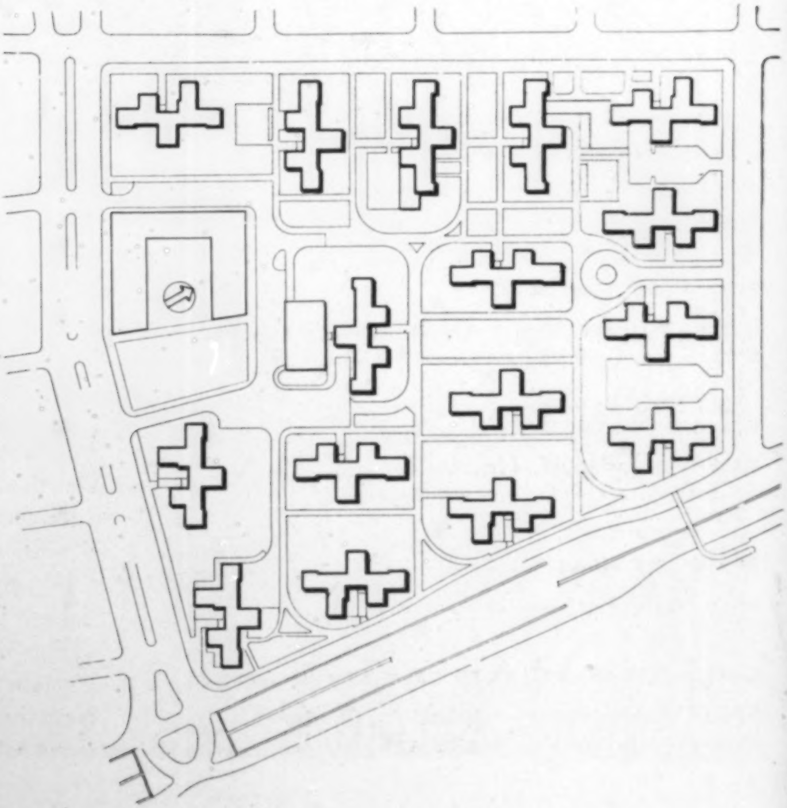
Architecturally, the big difference between the high-density and the low-density apartment development lies in the provision of vertical transportation, vertical construction, vertical services. In the luxury apartment, to be sure, construction costs have been held down, but elevator economy has been subordinated to the convenient disposition of individual apartment plans, and heating has been nothing if not generous. Construction, vertical transportation, and heating are the three components on which the RECORD herewith offers significant and ground-breaking studies. Incidentally, they supply a more solid basis for evaluating the centralized land program.

The new inventions devised for the high-density, low-rental field are spilling over into the entire apartment building program, including the luxury apartment, which might as well be efficient.

LILLIAN WALD HOUSES, New York . . . . a Building

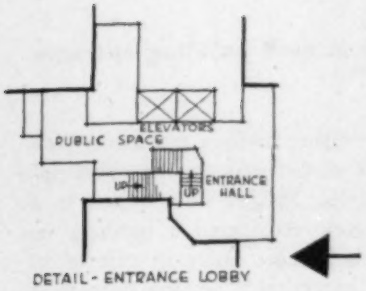


Program: 1,932 apartments of 6,444 rooms, to house 7,038 persons at 436 per acre, or 4.36 persons on an area 21.3 ft. square



Frederick L. Ackerman, Lafayette Goldstone, Architects
Fred N. Severud, Structural Engineer
Sullivan A. N. Patorno, Mechanical Engineer
Leo. A. Novick, Landscape Architect

Types Study guinea pig



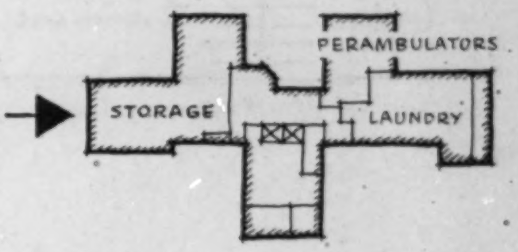
DETAIL - ENTRANCE LOBBY

ONCE in a while there comes along a project that is virtually hand-tailored for the purpose of demonstrating architectural principles. The educational value of such a project is undiminished, regardless of any modifications that may befall in the course of execution.

Lillian Wald Houses would appear to be such a test project. It serves admirably to demonstrate a point of view in such fields of experimentation as:

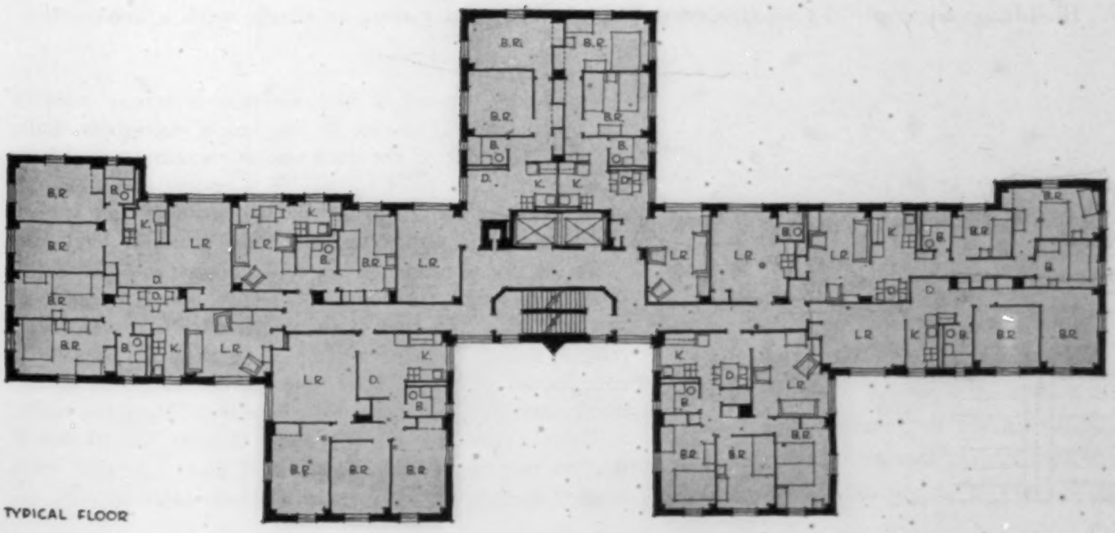
1. Planning for the most efficient use of elevators

2. Elimination of the basement, and use of the ground floor for tenant conveniences, all accessible without need for going outdoors. Despite the greatly increased number of facilities, control is simpler



3. Structural advances, such as the use of the "slab-band" method of eliminating ceiling beams in a manner which leaves room surfaces smooth and unobstructed

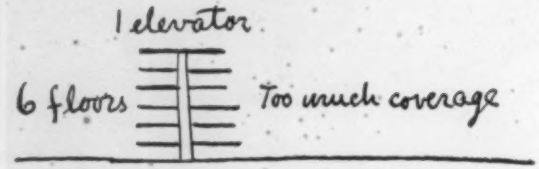
The extensive reference to Lillian Wald Houses on the succeeding pages is to be taken not as a "presentation" of the project but as an *analysis by means of the project.* The discussion is based on a set of notes on "the theory of low-rental, high-density projects" by the architects, Frederick L. Ackerman and Lafayette Goldstone.



TYPICAL FLOOR

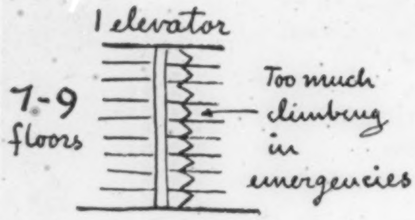
1. What building height, with how many elevators to serve

Answer 1. 6-story buildings with a single elevator serving apartments at each building entrance



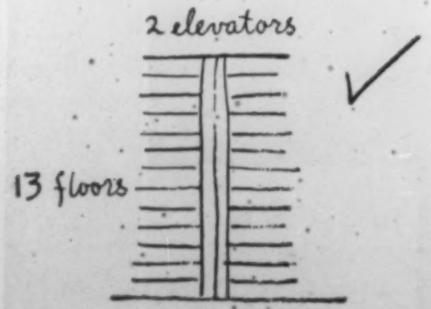
This was a solution used in earlier housing projects in New York City. It was based on evolution from the "walk-up" rather than on fresh analysis. Height was limited to 6 stories, largely because it was considered a hardship on tenants to ask them to climb more floors in case of no elevator service because of breakdown. Serving only about 20 rooms per floor, elevators are only about 25 per cent utilized. Land coverage, at about 30 per cent, is considered excessive by the architects. For this reason, in the search for more efficiency, this type was abandoned.

Answer 2. Buildings 7 to 9 stories with a single elevator serving apartments at each entrance



To get more efficient use of the single elevator, standards of amenity were gradually lowered, permitting 7 to 9 stories. The amount of climbing involved in out-of service periods is even worse than in the case of 6-story buildings; and further study of this type was promptly abandoned.

Answer 3. Buildings of about 13 stories, with the elevators in pairs, or single with a cross-over



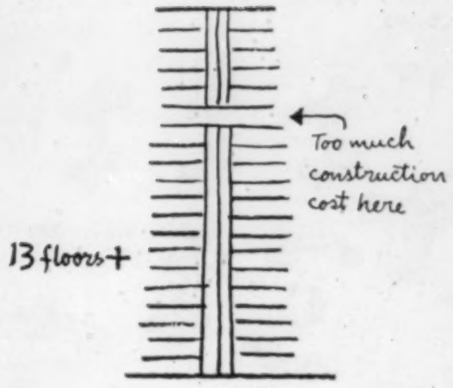
To get more use out of each elevator, buildings could be run up to about 13 stories. At this height emergency climbing would be out of the question, so elevators would have to be installed in pairs to provide a reserve. This arrangement would serve about 28 rooms per floor per pair of elevators. One elevator could more than handle it alone.

To let one elevator do so, and still provide for breakdowns, one might space elevators singly, one to an entrance, and rely on a cross-over at about the 8th floor. In emergencies, no tenant would then climb more than 5 floors. But in emergencies this would lead to serious confusion, serious overloading of the one elevator remaining. (Diagram, right.)

Therefore the architects adopted another line of reasoning; to pair the elevators, let them make alternate stops, connect each pair to a larger number of rooms laterally.

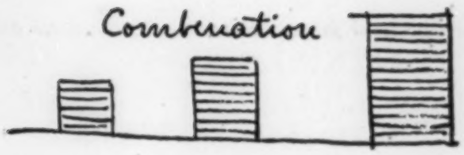
each building unit?

Answer 4. Buildings of more than 13 stories, with elevators paired



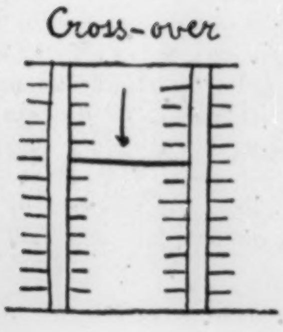
If, instead of getting more tenants per elevator by lateral connections, one tried to get them by vertical extension of the building, the problem would be one of construction costs and equipment costs pertaining to the building as a whole. Up to the 13th or 14th floor, the cost per apartment, room, or person for heating, plumbing, and electrical work definitely declines, in varying ratios, as height increases—up to that height where expansion loops must be inserted in vertical heating and plumbing lines. This occurs when height passes approx. 120 ft. or 13 stories. At this point construction costs take a jump, as do also code requirements.

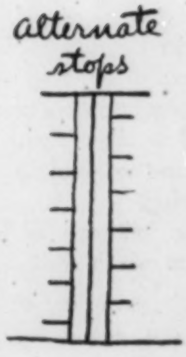
Answer 5. Mixed building heights, with elevator treatment varying



From the standpoint of elevator efficiency, a mixture of heights, each inefficient in itself, makes no more sense than the use of any one such type standing alone, whatever may be the decision reached on other sets of factors.

CONCLUSIONS.



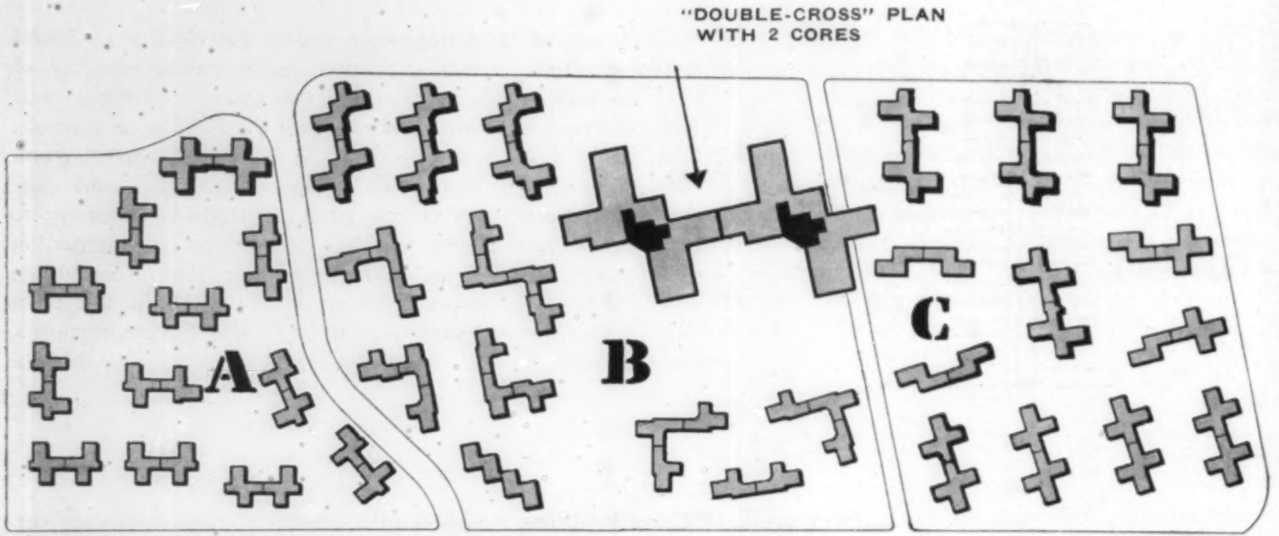


Elevators are highly expensive building components to install and to operate. Elevator efficiency depends on serving more tenants than heretofore normally, while avoiding serious confusion and serious overload in the event of a single-elevator breakdown. The most promising line of inquiry would appear to be the use of 13-story buildings with paired elevators, each stopping at alternate floors.

To obtain more tenants per elevator per floor, we must next seek more efficient use of the building "core."

2. Reducing the number of expensive "cores"

A "core" includes entrances, public halls, elevators, stairs, incinerator stack



"DOUBLE-CROSS" PLAN
WITH 2 CORES

SOLUTIONS A,B,C, are on the precedent of Project "X" above, by 3 other architectural firms. Comparison is statistical only

It is *obvious that a single core can be made to serve approximately 40 rooms per floor with greater efficiency than it can serve 20 rooms per floor.* Next comes the question of the relative cost of the larger core itself.

A preconception that lateral halls, feeding a line of vertical transportation, were to be looked on as so much waste in cost and maintenance, seems to have blocked all consideration of their very great utility in low-rental projects. It must therefore be said explicitly that so long as a constant ratio is maintained between the area of the core and the area of the rest of the building, it is economical to add to the core whatever area may be needed to serve more rooms per floor.

The larger the number of rooms surrounding the core, the smaller will be the number of cores required in a project. The project we are considering calls for 1,932 apartments, composed of 6,444 rooms, to house 7,038 persons. By providing a single core for every building unit, it was possible to accommodate this entire population with only 13 cores. Even if each receives two entrances, the total number is still well below the number which would be required if the project were to be designed in customary fashion, on the precedent of a comparable project which uses a double-cross building plan with a core at each cross. Using 13 stories both ways, yields this:

13-Story Structures Total number of:	Double Core Plan	Single Core Plan
structures	10	13
entrances	20	13 or 26
elevators	40	26
scissors stairs	20	13
incinerators	20	13

With respect to elevator efficiency, normal conditions and emergency conditions set up very different requirements. Normally, the architect is trying to let each elevator come as close as possible to handling about 400 tenants.* But under emergency conditions, when one elevator of a pair is out of order or not working, the object is to keep from assigning *more* than 400 people to the remaining car, and to allow plenty of lobby space for the enlarged crowd, and to avoid forcing tenants to extreme distances of climbing.

In the following table, efficiency is measured by the degree to which there is a constant, full traffic *load per*

---

* *See detailed set of elevator requirements on page 78.*

- - double-cross plan vs. single-core unit

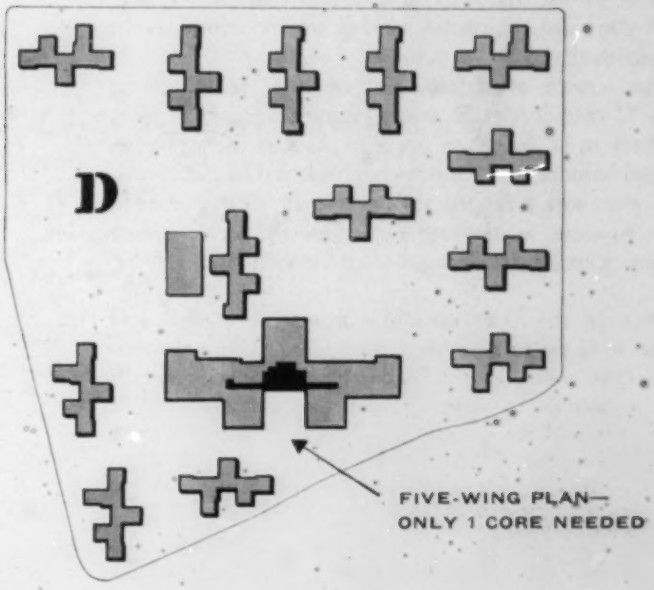
***Problem:** To provide access for 7,038 persons to 1,932 apartments of 6,444 rms, economizing on entrances or "cores"*

***Solution A:** Almost all 6-story buildings, 1 elevator per core . . . 53 entrances*

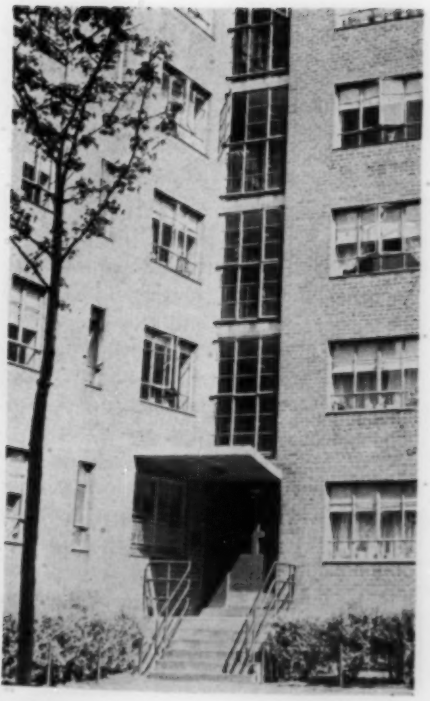
***Solution B:** Mixed heights, the elevators paired in the taller ones . . . 46 entrances*

***Solution C:** Mostly 13-story bldgs., 2-X plan, elevators paired . . . 31 entrances*

***Solution D:** All tall bldgs., single-core plan, elevators paired, 13 entrances. Eliminates 14 elevators, 7 scissors stairs, 7 incinerators, 7 entrance locations*



SOLUTION D is the Lillian Wald arrangement



core under both opposed sets of conditions, and the degree to which the *load per elevator* approaches 400 without over-running:

Project	Building Description	Traffic: number of persons per core	per elevator
X	6-story, 1 elevator	72-104	72-104
X	13-story, 2 elevators	350	175
	1 elevator out of use	350	350
X	Same kind of building, except having only 1 elevator at each core, and a cross-over at 8th or 9th floor: if 1 elevator is out of use, the remaining one serves approx.		640
L.W.	13-story, 2 elevators	420	210
	1 elevator out of use	420	420

Summarizing the results of the table, clearly the Lillian Wald arrangement comes closest to full normal load, without serious peak overload. At the undesirable extreme, the cross-over arrangement produces heavy peak overloads, and the 6-story building with only 1 elevator gives no emergency service whatever for the tenants.

Continued on next page.

A smaller number of building cores has the further advantage of cutting down the number of entrances, and permitting them to be disposed for far greater convenience. At the outset, let it be said that there is no miracle of design by which we can get out of the jurisdiction of the fact that a project such as Lillian Wald proposes to house 7,038 persons at the ratio of 436 persons per acre, or 4.36 persons on an area 21.3 ft. by 21.3 ft. These are stubborn facts, and there are no tricks by which housing of such density can recall the pattern of living which characterizes projects of six to ten families to the acre. Is it not better to recognize frankly that the two situations differ in a fundamental way, and the *crowd* is what we are dealing with, not individuals?

Under crowd conditions, the question is, which is better: 52 entrances at 52 widely scattered points in plan, frequently to be found on opposite sides of the structure, arranged without order and without relation to trafficways, or 26 entrances arranged in pairs at 13 clearly marked points, in close relationship to trafficways? The answer involves question of *control* and of *convenience.*

Control. In the older method, control is scattered over the site at 52 points seemingly placed at random; the new concentrates control at 13 points. If the scattering really made it possible to disperse the crowd, there would be more to be said for it; but even when its work has been done, the number of persons per entrance is of the order of 100.

Convenience. Hitherto entrances have been placed generally on the court side of structures, in areas assigned also to rest, recreation and play. Because of the very large number of persons coming and going in a project of high density, there results considerable confusion; pedestrians going about their affairs of the day get mixed up with adults who seek rest or children who want to play in the open spaces designed for such functions. Of course tenants familiar with the project will come and go every which way across it; yet the arrangement made possible at Lillian Wald by the concentration of cores will lessen the confusion of criss-crossing and will aid the new visitor to get around without being a walking question mark. (See site plan on right-hand page.)

Order and System. We have just discussed the kind of order and system that the single-core plan sets up in the *external* relationships of the buildings. Economical management and maintenance of a project depends in no small measure upon whether or not the planning of site and structures aids simplification or makes the problems of management more difficult to solve. We now find that the same kind of order and system which aids operation among buildings and grounds works *internally* also. Because of the uniform arrangement of the cores, like spaces are to be found in the same location in all structures. Because these spaces are made visible from the central public space, through glass doors, they can be found and observed with ease from the halls of the "core." Once the basic orderliness has been established, it is perfectly permissible to bring in a few simple variations such as the mirror reversal. Tenants will take this in their stride.

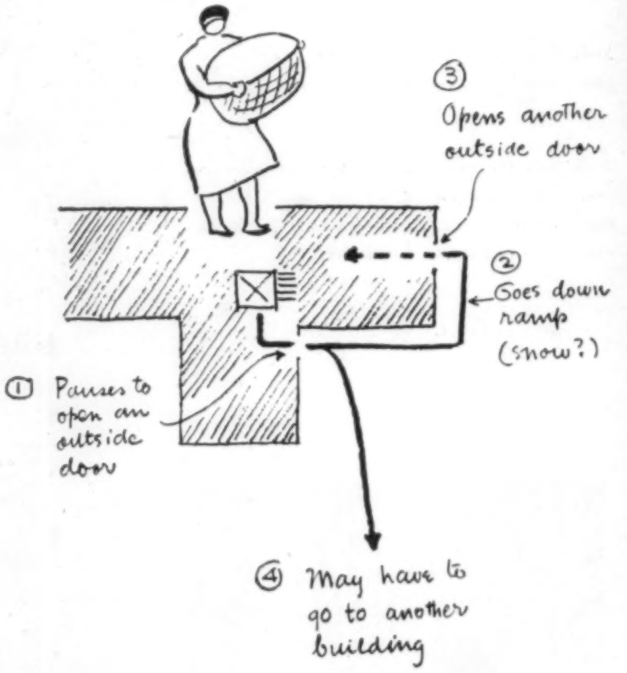
In a more general way we may say that variations introduced without reason are bothersome.

3. Single-core building

The single-core building plan yields a highly useful single entrance, and single control point, for the "basement." At Lillian Wald, because of foundation conditions, this was put at ground level. Advantages are:

All-indoor access under simple control: most of the "basement" can be seen from the public area through glass doors.

No ramps, outside doors, ice or snow to be struggled with by tenants handling laundry, baby carriages, bicycles, and scooters, or taking children to the toilet.

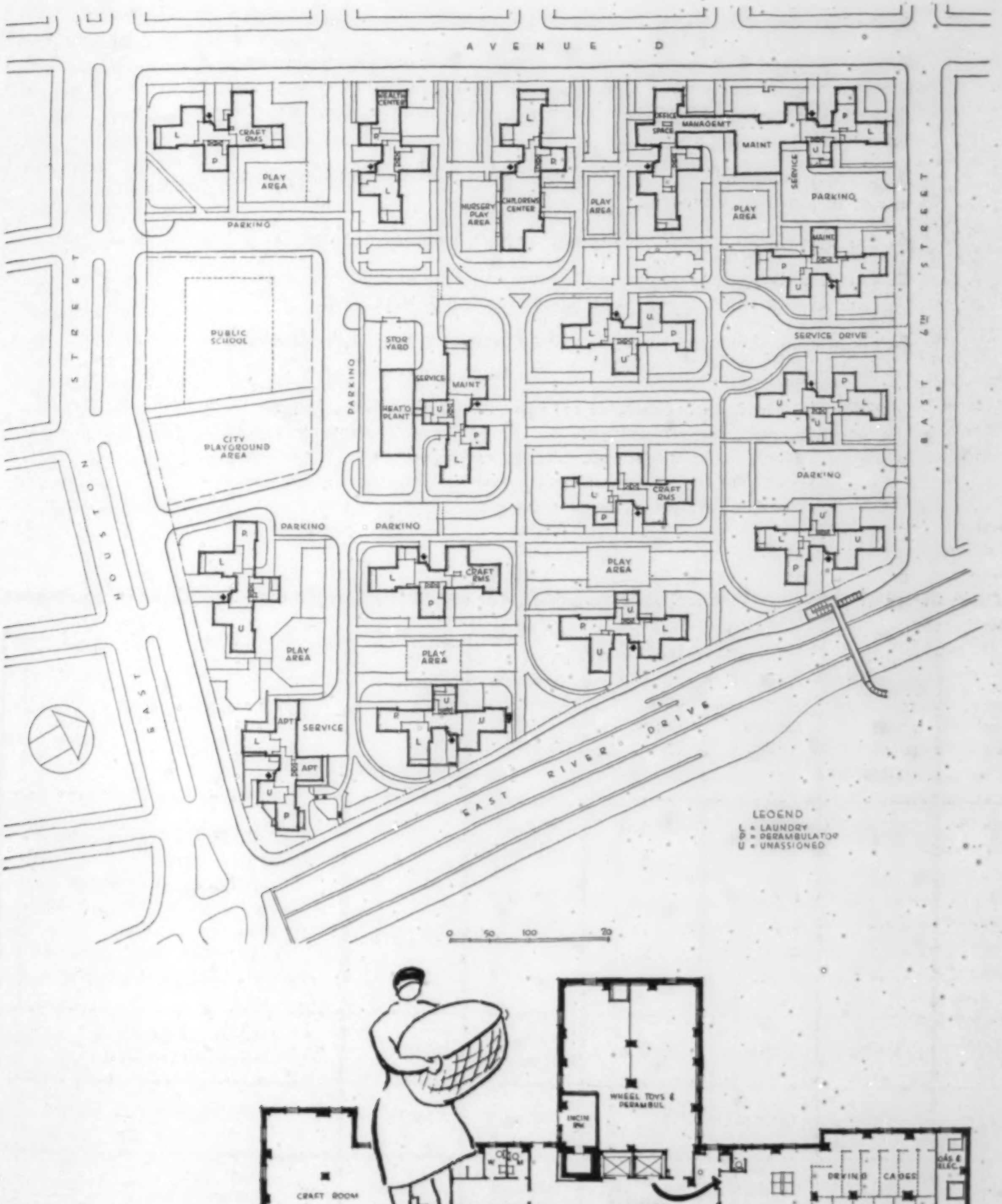

③ Opens another outside door
② Goes down ramp (snow?)
① Pauses to open an outside door
④ May have to go to another building

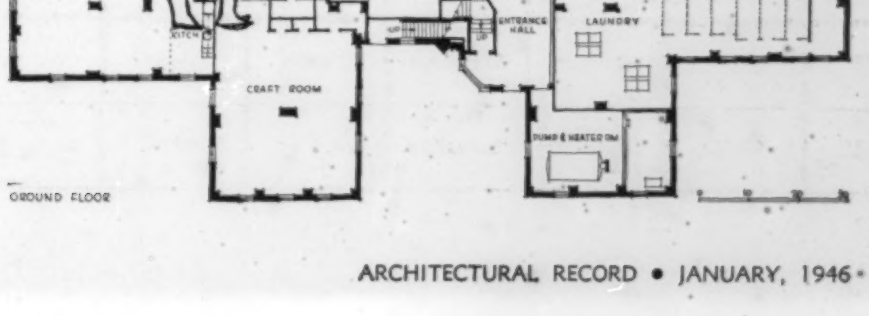
No areaways needed for lighting project offices, maintenance rooms, storage, workshops, social rooms.

Small vehicles of all kinds exit directly at ground level to interior areas of the project where they are to be used.

Note that many high-density projects hitherto, public or private, have supplied not nearly enough facilities for laundry, storage, etc., to their thousands of tenants.

design permits all-indoor tenant services


AVENUE D
HOUSTON STREET
EAST 6TH STREET
EAST RIVER DRIVE
CRAFT RMS
HEALTH CENTER
OFFICE SPACE
MANAGEMT
MAINT
SERVICE
PARKING
PLAY AREA
NURSERY PLAY AREA
CHILDRENS CENTER
PUBLIC SCHOOL
CITY PLAYGROUND AREA
STOR YARD
HEAT'G PLANT
SERVICE DRIVE
APT
LEGEND
L = LAUNDRY
P = PERAMBULATOR
U = UNASSIGNED
0 50 100 200


WHEEL TOYS & PERAMBUL
INCIN RM
CRAFT ROOM
CRAFT ROOM
KITCH
UP
UP
ENTRANCE HALL
LAUNDRY
DRYING CAGES
GAS & ELEC.
PUMP & HEATER RM
GROUND FLOOR
0 10 20 30

4. Elevator performance requires the careful balancing of

CRITERIA FOR SATISFACTORY ELEVATOR SERVICE IN LOW-RENTAL APARTMENTS

1. Any building 4 stories or over should be provided with elevator service.

2. Each building floor should be provided with at least one elevator opening to afford tenants access to an elevator on the floor which they occupy. An elevator for each floor will permit transportation of furniture directly to the desired floor.

3. Tenants should not be required to walk down more than one floor, even in case of a one-car shutdown.

4. Car sizes should be such as to permit adequate handling of furniture.

5. Car sizes should be such that in the event of a one-car shutdown, a maximum number of two trips would be required to handle peak load.

6. Speed of car should be selected so that the round trip time shall not exceed 3 minutes.

NOTE: The arrangements used on previous high-density public projects do not generally meet the requirements of (3) enumerated above, and only where an 1800 lb. car has been used, have the requirements of (4) been met. The requirements of (2) cannot be met in low buildings nor on the lower floors of tall buildings served by a low-rise elevator.

13-STORY BUILDINGS

Comparison of different elevator arrangements and kinds of equipment

†Population served above bottom terminal landing	Cost of elevator equipment per building or unit served (1939 prices)	DEGREE OF SERVICE		Estimated round trip time	Cost of elevator equipment per person served (1939 prices)	ARRANGEMENT
		All cars operating	One car breakdown			
319	$12,700	Slow	** None	Well over 3 min. 3 min. and 46 seconds	$40.00	Standard NYCHA arrangement, used on Project X. One 1800-lb. car, 100 ft/min. high-rise. Stops on 1st, 8th, 9th, 10th, 11th, 12th, and 13th floors. One 1800-lb. car, 100 ft/min. low-rise. Stops on 1st, 3rd, 5th, and 7th floors.
Average 464.8	$14,000	Slow	Overload	4 min. and 19 seconds	$30.12	*Possible arrangements Two 2000-lb. cars 100 ft./min.
464.8	$20,000	Satisfactory	32% Overload	3 min.	$43.03	150 ft./min.
464.8	**$20,000**	**Satisfactory**	**10% Overload**	**2½ min.**	**$43.03**	**200 ft./min. (Recommended)**
464 8	$24,000	Satisfactory	Satisfactory	2⅓ min.	$51 63	250 ft./min
464.8	$24,000	Satisfactory	Satisfactory	2 1/6 min	$51.63	300 ft./min.

the factors of cost, capacity and car speed

By Sullivan A. S. Patorno, Consulting Engineer

ELEVATOR ARRANGEMENT MUST TAKE ACCOUNT OF SPEED

The check list of elevator requirements which appears on the previous page is the condensed result of a long, painstaking study.

The requirements are *performance* requirements. I think it is especially important to keep performance requirements in mind, when dealing with clients, public or private, who are interested chiefly in low cost.

The first cost saving that such a client is likely to try to make is in the matter of elevator *speed*. He overlooks the fact that by so doing he may cancel out all the advantages which the architect and engineer have obtained by a more efficient *plan*. Correct solutions cannot be made in terms of time alone, or space alone, but only of time-space.

In a solution such as Lillian Wald Houses we come closer to loading the elevators properly, by assigning to each of them a population of 232, as compared with a population of only 174 for 13-story buildings in Project X. But if, in serving the larger population there were to be retained the same old speed of 100 ft./min., our *round-trip time* would jump to an estimated 4 min. 19 sec. at Lillian Wald, as against 3 min. 46 sec. at X.

By proposing a higher speed of 200 ft./min. we can make the round trip at Lillian Wald in an estimated 2½ min. raising the standards of amenity instead of lowering them. The architect and engineer must guard particularly against such use of their new inventions as will lower instead of raising the standard of performance, i.e., the standard of living.

Degree of fulfillment of criteria for elevator performance

Building 4 stories or over to have elevators	Access to elevators from floor occupied	Maximum walking down one floor in case of one car breakdown	Car size to handle furniture adequately	Maximum of two trips to handle peak load in case of one car breakdown	Estimated round trip time — 3 minutes or less
YES	NO	NO	YES (but furniture must be handled over stairs at 2nd, 4th, and 6th floors)	NO	NO
YES	YES	YES	YES	YES	NO
YES	YES	YES	YES	YES	YES
YES	**YES**	**YES**	**YES**	**YES**	**YES**
YES	YES	YES	YES	YES	YES
YES	YES	YES	YES	YES	YES

NOTES

† These figures represent total population from top floor down to and including 1st landing above bottom terminal landing.

** One with stops at Ground Floor, 1-3-5-7-9-11 and 13 Fl. One with stops at Ground Floor, 2-4-6-8-10 and 12 Fl.*

*** This comment applies to floors served by inoperative car.*

Summary: High-density apartment design for elevator efficiency

In seeking for more efficient use of the expensive elevator installation, the architects of the Lillian Wald project in New York evolved the "single-core" type of apartment building, based on the following "theory":

a. Elevators should run in pairs

b. Structures should be so designed as to put the full load upon one elevator when the other is out of commission.

c. Tenants will take *that* elevator which lands at the floor upon which they live (elevators make alternate stops with the result that 2 elevators cover the needs of all floors).

d. Tenants will take *that* door which leads directly to their own elevator.

e. Locating stairs between elevators would reduce by half the number of people who would congregate at one point, were two elevators placed side by side.

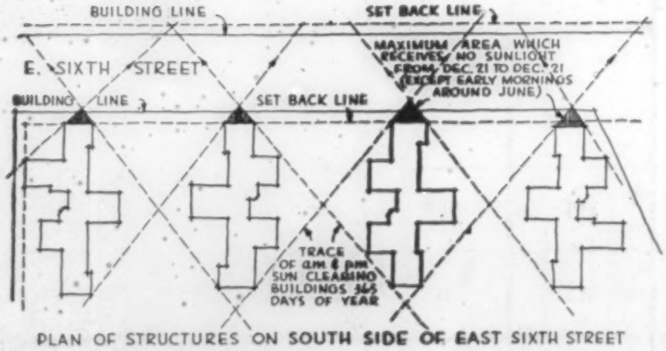
f. Stairs and the space in front of elevators should have ample lighting.

A corollary of the single-core elevator plan has been the interior-access service floor, which can be placed either in the basement or, preferably, at ground level. There is then no need for a person carrying laundry or bundles, or taking children, to go out of doors or use ramps on the way to service areas. Easy visibility and control of "basement" activities can be had from the central public area. If placed at ground level, this service floor eliminates the need for areaways for lighting, and makes it possible for small vehicles to be rolled in and out at grade. Any high-density project needs a large number of such service "basements" or ground-floor areas.

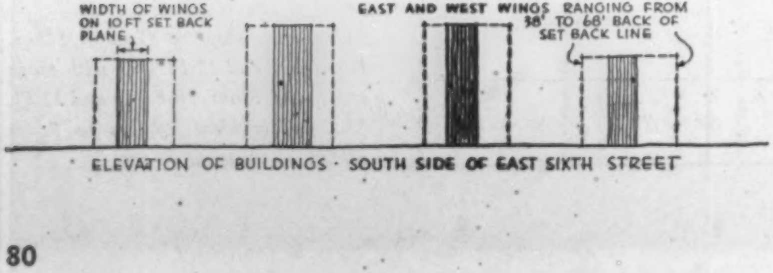
Elevator arrangement and equipment must be selected on a performance basis. Any change of population cared for by a single elevator must be accompanied by an adjustment of speed. Otherwise gains made by a more efficient plan are lost by inefficient equipment and there is retrogression instead of progress.

Comment. After all the adjustments have been made that the architect suggest, as reported in this study, the question still remains whether densities as high as 400 or more persons to the acre can be made, at best, to yield uniformly good livable plans. The individual apartments at Lillian Wald are well above the usual standard in important respects. Yet despite the architects' unusual skill there remain in such a project some few apartment plans which involve the use of living-rooms as traffic ways, or that preclude through-ventilation. If, indeed, "there are no tricks by which housing at 436 persons per acre can be made to recall the pattern which characterizes projects of six to 10 families per acre," then it is not the architect and engineer but the land policy which is at fault.

ELEVATOR BUILDINGS AND THE BUILDING LINE


BUILDING LINE
SET BACK LINE
E. SIXTH STREET
BUILDING LINE
SET BACK LINE
MAXIMUM AREA WHICH RECEIVES NO SUNLIGHT FROM DEC. 21 TO DEC. 21 (EXCEPT EARLY MORNINGS AROUND JUNE)
TRACE OF am & pm SUN CLEARING BUILDINGS 365 DAYS OF YEAR

PLAN OF STRUCTURES ON SOUTH SIDE OF EAST SIXTH STREET


WIDTH OF WINGS ON 10 FT SET BACK PLANE
EAST AND WEST WINGS RANGING FROM 38' TO 68' BACK OF SET BACK LINE

ELEVATION OF BUILDINGS · SOUTH SIDE OF EAST SIXTH STREET

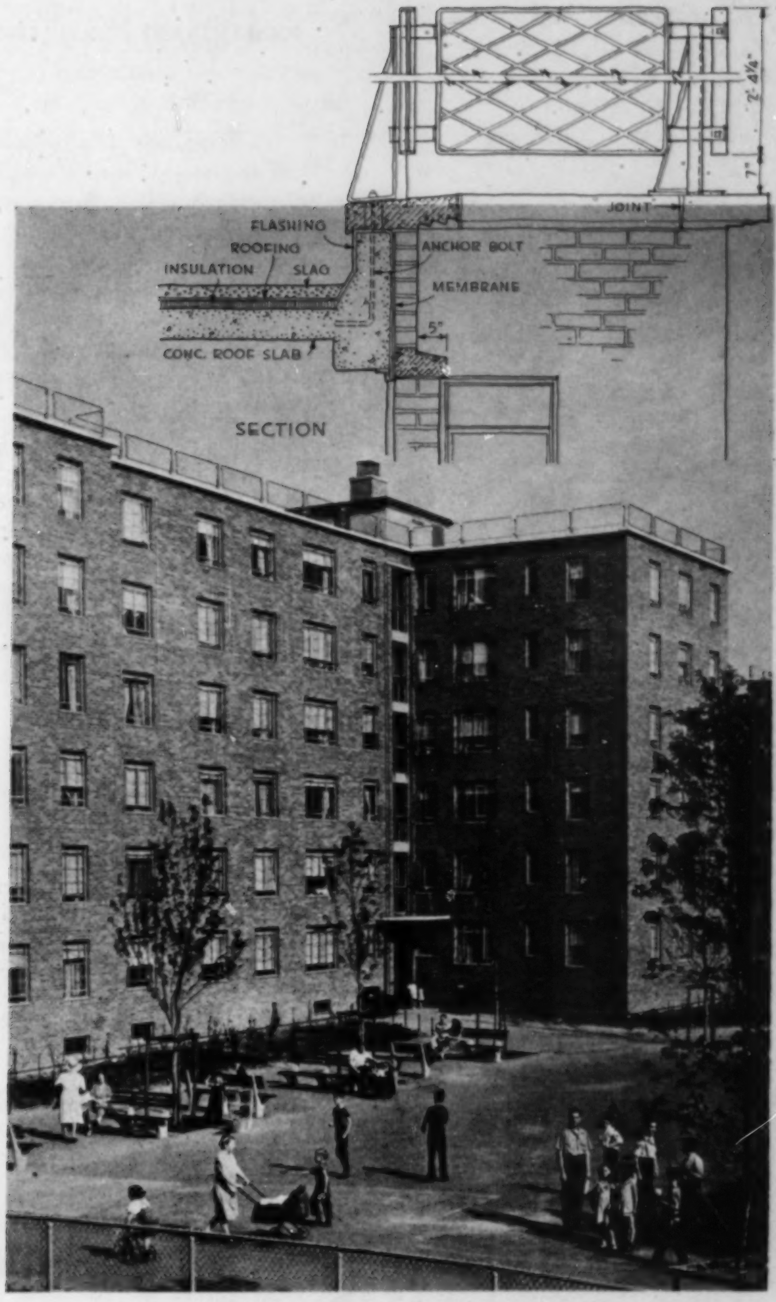
Building orientation and sunlight control pose new problems when high density developments are built in the form of tall apartments. The sketch shows a group of the proposed Lillian Wald apartments placed with the short end of one wing abutting the street at about the set-back line. The sun tracers drawn in on the diagram show that despite the closeness of these wing ends to the street, the sun sweeps the whole street and much of it gets sunlight at more than one time of day. Only the tiny triangular shaded areas miss direct sunlight at all times. Despite its actual efficiency such an arrangement may have code conditions to contend with. Code authorities are so accustomed to solid lines of buildings that these buildings might actually have an easier time if they were all connected together at their transverse wings and if the wings abutting the street were then considered as "dormers." Of course, they would shade the street much worse but they would meet *regulations.*

EFFICIENCY IN STRUCTURE

Invokes the principle of continuity

From Fred N. Severud,

Structural Engineer



To make more progress in the structural design of tall buildings, we shall have to let more and more of the building fabric come awake. Our tall buildings are overloaded with sleeping members which are figured as elements of enclosure only, while they are asked to contribute nothing to support.

The demand for more economy is sharpened by the fact that we are now using tall buildings as they were not used in the beginning. Now that low rentals come into the picture, we must eliminate every possible pound of excess weight, and cut down every wasted inch of space.

Lest this expression of a personal opinion appear too much like dogmatic lecturing, let us hold it in abeyance, while we review the present situation in tall apartment buildings in factual detail.

We shall discuss, first, the problem of the floor slab and its support; second, the problem of stiffening the tall apartment building; and third, future possibilities in structural design.

1. THE FLOOR SLAB AND ITS SUPPORT

PRELIMINARY CONSIDERATIONS: FLOOR AND CEILING FINISHES

These finishes help to determine the structure itself.

The floor covering is usually asphalt tile or wood in mastic, resting directly on the structural slab. Even if cinder concrete is used for the structural floor slab, a finished smooth concrete surface is provided underneath the asphalt tile by means of a ½-in. topping of cement mortar which is considered as part of the structure. The conduits are run in the slabs, and if the framing is of structural steel, the beams are generally kept 2 in. below the surface to leave room for the conduits as they cross the beams or as they turn up into partitions.

The ceiling finish is of fundamental importance and will often dictate the type of structure to be selected.

a. Painted concrete: From the maintenance standpoint, there is great advantage in using painted concrete ceilings, left with the texture of the plywood form. This avoids the difficulty of plaster spalling due to any accidental water leakage from the floors above. Stains from damp spots tend to disappear gradually without further attention from the maintenance force.

By a recent change in the New York building code, cinder concrete of increased thickness is allowed in spans up to 10 ft. between steel beam flanges; but living rooms and main bedrooms are usually larger than this.

b. Plaster and acoustic tile: Against the trend toward painted concrete is the recent interest in acoustical ceiling treatments involving either acoustic plaster or acoustic tile which can be cemented directly to the concrete. It should be remembered also that union regulations have an important bearing. Low-rent public housing has been accepted by the unions with unplastered ceilings, but there is still a question of how the situation may develop for private ventures.

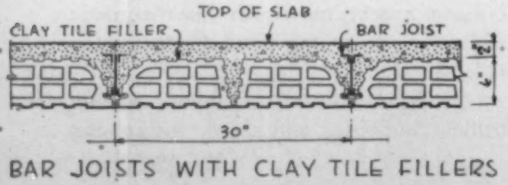
THE TREND TOWARD ELIMINATING FILLER BEAMS

There is a general tendency to get rid of any filler beams in the ceilings of main rooms, both living rooms and bedrooms. This serves not only to make these rooms far more agreeable but also to simplify plastering and painting.

a. The influence of materials: stone concrete vs. cinder concrete: Stone concrete is stronger. A fiber stress of 20,000 p.s.i. is now generally allowed for steel beams fully encased in stone concrete, whereas only 18,000 p.s.i. is allowed for cinder arch construction with ½-in. top dressing of mortar considered as part of the structure. Therefore, if painted concrete ceilings are accepted, stone-concrete slabs supported on steel framing become the most economical means at present of obtaining unobstructed ceilings in rooms of more than 10 ft. clear span.

b. New aggregates: One development that is important to watch for is the expected arrival, in the near future, of aggregates to produce *lightweight concrete of strength equal to ordinary stone concrete*. A plant is being designed within easy shipping distance of the New York metropolitan area. Cost comparisons show that such a type of construction, supported on a steel or concrete frame, would have many advantages.

Fig. 1. Innovation on ideas old as the Romans. This was being started just before the war. Planks are the only needed form work



c. T. C. floor arch systems: Another system that is of interest is shown in Fig. 1. This consists of a steel frame with steel joists spanning the floors, and hollow-tile filler blocks between the steel joists. After concrete has been poured, this type of construction becomes fully fireproof. It is very light, uses a minimum of formwork, and is especially intriguing under present conditions of labor. It was just being started before war broke out, but sufficient work has been done to prove it successful and economical.

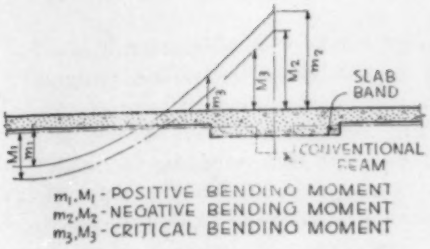

SLAB BAND
CONVENTIONAL BEAM
M_1
m_1
m_3
M_3
M_2
m_2
m_1, M_1 - POSITIVE BENDING MOMENT
m_2, M_2 - NEGATIVE BENDING MOMENT
m_3, M_3 - CRITICAL BENDING MOMENT

Fig. 2. The "slab-band," an innovation on the conventional beam. Small letters represent bending moments of the slab band, capital letters of the conventional beam. Although the initial negative bending moment, m_2, of the slab band is greater than that of the conventional beam (M_2), the critical bending moment m_3, is appreciably smaller than M_3

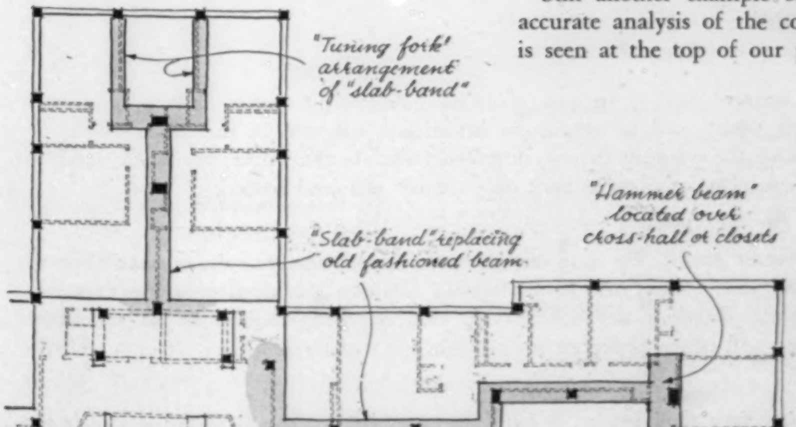
d. The revolutionary re-analysis of concrete: During recent years the analysis of reinforced concrete has undergone a revolution. Instead of dealing separately with slabs, beams, and columns, the recent methods consider all these members as component parts of a single monolith. In other words, we can now deal with the structure as a continuity. The result has been that a new field has been opened for the more correct distribution of materials, and also for a far greater latitude in shapes and forms.

THE NEW CONCEPT: SLAB, BEAM, AND COLUMN AS A CONTINUITY

a. Slab bands: A good example of re-analysis of reinforced concrete is the "slab-band" type of floor slab articulation, replacing the conventional ceiling beam. (Fig. 2.)

1. Cantilevering and bending slab bands: An outstanding characteristic of the slab-band design is the way it permits carrying the structural arm around bends and elbows, accommodating it to the exigencies of the room plan, without the need for columns at every change of direction.

Fig. 3. The part-plan below is taken from the proposed Lillian Wald houses (see pages 70 to 80). Shaded areas show three ways of handling the highly adaptable slab band; dotted lines are the room partitions. Band creates minimum interference with a smooth ceiling


"Tuning fork" arrangement of "slab-band"
"Slab-band" replacing old fashioned beam
"Hammer beam" located over cross-hall or closets
Elbow in "slab band"
FRAMING PLAN
0
10
20
30

2. Slab bands: elbow, "hammer-head," "tuning fork": A whole series of possible slab-band treatments is to be seen in Fig. 3, applied to a single floor. This is from the Lillian Wald project in New York (see pages 70 to 80—Ed.). At the bottom of the plan is seen a simple elbow, with no need for a column underneath. In the righthand wing is a "hammer-head" treatment of the slab-band. This is a very convenient disposition to handle a three-bedroom arrangement at the end of a wing. The "hammer-head" can be so located that the drop in ceiling height occurs over closets and corridors, and all bedrooms have completely flat ceilings. The slabs framing into the "hammer-head" can be made to turn the corner by fanning the bars and providing diagonal cross bars in the outside corners, or else some reinforcing bars can be arranged within the thickness of the slab from each end of the "hammer-head" to the outside wall.

Still another example of freedom in handling slab bands, as the result of accurate analysis of the concrete monolithic frame, is the "tuning fork." This is seen at the top of our plan diagram. Here a three-bedroom arrangement is

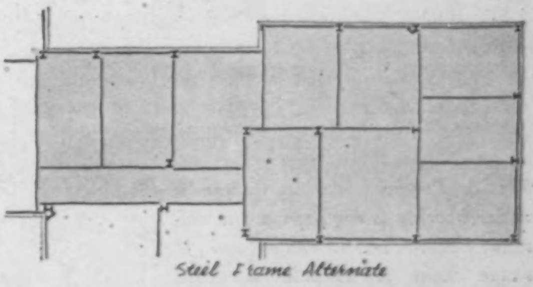


Fig. 4. Steel frame alternate for part of the plan shown at left. Main rooms handled without filler beams

framed with a single center column and with bands at the partitions only. Where a band runs along the partition lines, as in this example, the slight saving involved in partition height can add up to a noticeable economy. This is because the repetition of the same arrangement in a large project can run the partitions into miles of length.

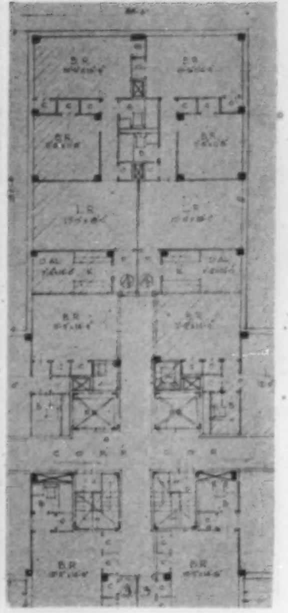


Fig. 5. A plan study in which columns are so placed as to permit entirely flat-slab ceilings. By Voorhees, Walker, Foley & Smith for New York Life Insurance Company

3. Columns in relation to slab bands: Columns are an integral factor in the new analysis of concrete, and the greater *freedom of placing columns* contributes to the flexibility of slab-band method of design. This is arrived at in the following way:

A column has an inherent capacity to resist bending. Small eccentricities of load can, therefore, be tolerated without any modification of the column. Greater eccentricities can be handled very economically by increasing the size of the column, so that it acts both as a column and a vertical beam. You can test this by holding a pitcher of water in your right hand, and then extending your right arm sideward. Your body is a live column, your arm a live bracket. You will feel a slight bend in your torso and increased load on your right foot, which you instinctively counterbalance. The same combination of stresses is set up in the slab-band structure. The band is wide enough so that a column can be offset and yet come under the slab; the eccentricities of loading are resisted by an increase in the column size (see column indication under the "hammer head" and the "tuning fork" in our diagram plan). This method is much more economical than introducing a new horizontal beam involving a new member and additional form work. It also allows the structure to follow the architectural room arrangement without the necessity for cross beams.

b. Completely flat ceilings. With a proper distribution of columns, completely flat ceilings will be found to be the most economical type of construction in many cases. The determining element here is usually the tendency of the concrete slab to punch through at the column heads. Various steel column heads have been invented to overcome this handicap, and they can be placed within the thickness of the slab. Sometimes poured brackets have been used, but they do not look well, particularly when they occur at partitions. Fig. 5 shows an architectural arrangement that lends itself very well to a completely flat slab. Here the column spacings are such that no special column heads of any type will be required A sufficient area at the top of the column to prevent punching through by the slab was obtained by holding all interior columns to a minimum cross-section of 16 by 16 in. Although this was larger than necessary in the upper stories, the economy in form work obtained by repetition outweighed the cost of additional concrete. This combination will therefore provide for a thinner slab and a more economical column than would be obtained if columns were changed from story to story.

c. Column design for continuity.

1. Constant width: In proportioning columns, it seems best to hold to a constant width and to obtain the additional concrete in the lower stories by increasing the columns in one direction only. As the upper stories are reached, the same forms can be cut back to a smaller size and reused.

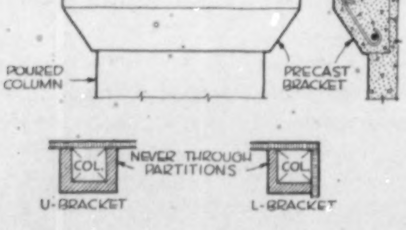


Fig. 6. Pre-cast brackets where a wider bearing is required at the column head. The L shape and U shape make it possible to avoid breaking through partitions at any column head

2. Precast heads: We have developed a *precast concrete column head* (Fig. 6) for those cases where the loads demand additional column area. As shown in the sketch, brackets are confined to two or three faces only, so that these brackets will never penetrate a partition.

3. Auxiliary steel angles at building core: An incidental useful device is the introduction of *steel angle struts* at the stairs and elevators, eliminating the need for beams or columns in the central building core and also making it easy for the builder to erect his material hoist.

d. Combined use of flat slab and slab band. The two types of floor slab shown, the flat slab and the slab-band type, can of course be used in combination. Where spans are long and loads are heavy, that part of the floor can be framed with the use of slab-bands. Elsewhere in the same building, where columns can be properly distributed, the ceiling can be a perfectly flat slab.

HEIGHT OF CONCRETE BUILDINGS

The usefulness of the new methods of building with concrete is confined by the economical height of concrete-frame buildings. This is limited usually by the height to which concrete can be poured from a crane bucket. It is perfectly practical, of course, to pour concrete at a height greater than about 13 stories, just as it is possible to pour cinder concrete in taller buildings. Excessive column sizes become necessary in all-concrete construction as the building rises higher; this situation can be overcome by using steel columns throughout in combination with concrete floors, or by a combination of steel and concrete columns in the lower stories.

2. STIFFENING THE TALL APARTMENT BUILDING

STIFFNESS OBTAINED FROM THE BUILDING SHAPE

As buildings increase in height, the problem arises of stability against wind. In apartment projects where the site permits it, a building plan in the form of a cross is becoming very popular. In analyzing for stiffness, the narrow wings are considered as cantilevers from the central core, and the major stiffness is derived from the core and from the pair of wings that is parallel to the direction of the wind.

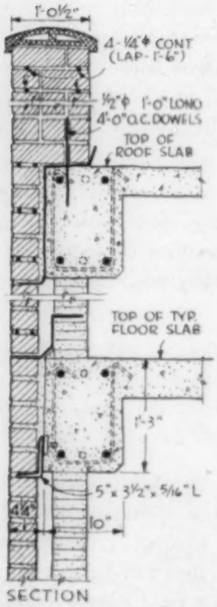


Fig. 7. "The two-fold advantage of the cavity wall is, first, that there is enough separation between the inside and outside wall so that each can follow its natural trend, and, second, that the connections in a degree are elastic"

STIFFNESS OBTAINED FROM EXTERIOR WALLS

In general, building codes make no allowance for the stiffness of outside walls, even though these walls are intrinsically by far the stiffest element in the whole building. Here are some expedients that may gradually overcome this handicap:

a. Reinforced brick: This has recently entered the picture, and we are convinced that before long the building departments will accept reinforced brick as a definite structural element. In our own work it has been used for more than 15 years with results uniformly excellent .

In the beginning there was a great deal of doubt to overcome, arising out of the idea that reinforcement in the joints would rust, the rust would cause spalling, and the masonry would deteriorate. To show that this is not the case, we mention that not a single rust spot has been detected, after about five years of exposure, in those units at Classon Point (York & Sawyer, architects), in which pencil rods were used with 8 in. concrete blocks. In addition, these units show the efficiency of the reinforcement in preventing cracks. During the war we have used miles and miles of reinforced masonry, and never at any time have we had any but good results.

b. Spandrels as structural members: By utilizing the wall section from the window head to the window sill next above as a structural element, it is possible to obtain greatly increased stiffness. In this manner the frame is relieved of its supposed burden of resisting lateral stresses, and the outside wall is given recognition for what it will do in any event, which is to furnish lateral stiffness. This is particularly to be emphasized in relation to flat-slab floor construction. Under some conditions a frame using flat floor slabs may not be stiff enough to carry the wind forces unaided.

c. Controlled concrete: The recent revision of the New York City building code to allow controlled concrete has had much to do with increasing efficiency in the use of reinforced concrete work. Smaller sections are required of all structural members, whether slabs or beams or columns. In addition to the economy there is achieved much better workmanship.

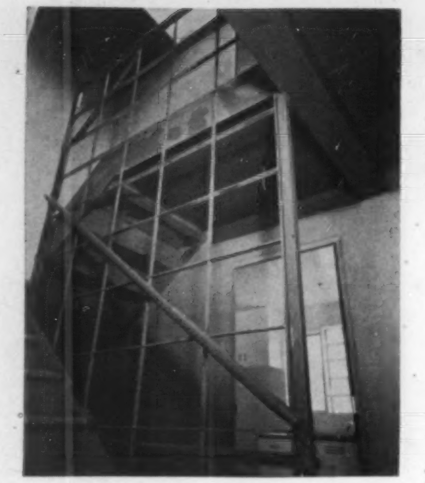


Fig. 8. Steel construction including box sections filled with concrete and used as ceilings. River Forest Garden Apartments, Chicago, Illinois, Holsman & Holsman and Klekamp, architects. The author proposes that this kind of steel ceiling form be so adapted that the concrete filling could be given credit for its inherent structural contribution

d. Cavity wall construction: In 1939 this firm designed what we believe is the first apartment house group in the United States using cavity wall construction. Recent inspection of the buildings shows truly amazing results. Not even a hairline crack is visible, though the building dimensions are very large. (Fig. 7.)

EXTERIOR WALL STRUCTURE INVOLVES PROBLEM OF CONTRACTION

Any structural calculation involving exterior walls must take into account the fact that the inside and the outside of a building exists under totally different conditions of weather. The exterior undergoes extremes. It may, for example, get wet and then be heated by the sun, or it may face sub-zero temperatures while the interior is comfortably warm or even hot.

Under conditions of extreme cold, the outside face wants to go in one direction while the inside face refuses to follow or may even want to go the other way. Eventually they have to travel the road together, or else something has to give. If the tension is too great, this happens literally in the form of an *explosion*. Cracks in masonry walls do not generally occur, as people suppose, in a gradual manner. The material holds together until strains build up that are beyond its endurance, and then it gives way with a bang. The twofold advantage of the cavity wall is, first, that there is enough separation between the inside and the outside wall so that each can follow its natural trend, and, second, that the connections are in a degree elastic.

Roof parapets, the extreme case

The problem mentioned above applies especially to roof parapet walls. Modern buildings differ from older ones in carrying a blanket of insulation above the roof slab. The slab therefore stays warm; not so the parapet. Exposed on three sides to the weather, it develops forces of contraction that can be terrific. While the roof slab to which it is intimately attached at its base yawns comfortably in its warmth, the parapet wall huddling in the cold will shrink from each free end toward the center. However, "free" is just an illusion. Though the wall is free to shrink at the top, its base is held expanded by the warm slab. The slab is like the extended arm of an archer holding the bow, while the frost draws back on it like the bow string. Since the parapet is far less elastic than the bow, it cracks at the building corner, where the strain is hardest. These explosions have been known to occur in wartime with a report that sent the occupants of the building scurrying.

There are several ways of providing extra reinforcement to overcome the strain, and one of the best ways of meeting the problem is to eliminate the parapet altogether. This has been done on East River Houses, New York, by substitution of a metal fence (Voorhees, Walker, Foley & Smith, architects.)

(Editor's Note: Mr. Severud's further discussion of this point, and his details for various solutions, have been considered sufficiently important as working information so that they have been assembled for publication in the February issue as Time Saver Standards.)

3. FUTURE POSSIBILITIES IN STRUCTURAL DESIGN

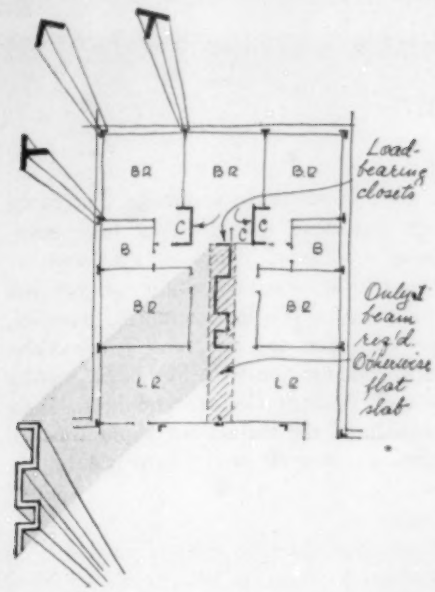

BR
BR
BR
Load-bearing closets
C
C
C
B
B
BR
BR
Only 1 beam req'd. Otherwise flat slab
LR
LR

Fig. 9. A new proposal for interior structural support. We already use L and T shapes (as at top of this plan). Why not, says the author, abandon the traditional interior column shapes also, squeeze them out into L's, and use them functionally as load bearing closets? No interior columns would be needed and a single slab-band along a passageway leaves all other ceilings flat. The plan is taken once more from Lillian Wald houses

WHY NOT CLOSETS AS COLUMNS?

We have already discussed the unutilized capacity of exterior walls to act as stiffeners. Supposing now that we come indoors. Here again we find a reduplication: partitions for space division only and columns for support only. We should certainly not want to go back to the old system of using the partition as a bearing wall, but is there not a part of it that we could thicken, without going to those undigested *lumps* in the plan where we now place our columns? Supposing that we were to put the extra material and extra strength that are needed for structural support into *banks of closets.* We would then get the same kind of structural support that is given by the column, but we would get it as an extra service out of a member that is necessary in any case for purposes of enclosure. We would simply be squeezing out our "columns" into a series of L's and arranging them to be spatially useful instead of acting as a mere obstruction for the tenant. (Fig. 9.)

a. In concrete: Modern methods of prestressing concrete would suggest that such closets could be formed by high-strength prestressed concrete shaped into angles. Placed side by side, they would form closets opening alternately in opposite directions.

The idea really amounts to providing a counterpart, in the vertical plane, to the slab-band already in use in the horizontal plane in the ceiling.

b. In steel: In steel there is another line of reasoning that comes to the same conclusion. There is already a trend toward using steel L's in the corners of partitions. Supposing that we make still larger structural steel shapes out of the closets. We could count on the recent development of vermiculite concrete as fireproofing for the steel.

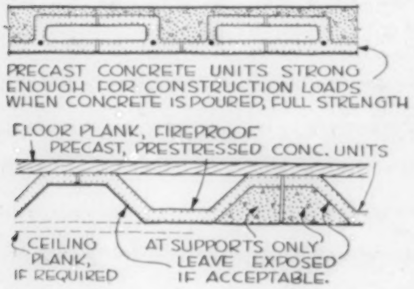

PRECAST CONCRETE UNITS STRONG ENOUGH FOR CONSTRUCTION LOADS WHEN CONCRETE IS POURED, FULL STRENGTH
FLOOR PLANK, FIREPROOF
PRECAST, PRESTRESSED CONC. UNITS
CEILING PLANK, IF REQUIRED
AT SUPPORTS ONLY
LEAVE EXPOSED IF ACCEPTABLE.

Fig. 10. Two ideas in reinforced concrete floor slab construction, using minimum amount of temporary support during construction

WHY NOT USE STEEL FORMS AS FLOOR-SLAB REINFORCEMENT?

By an extension of the same approach, it would seem to be sensible to use steel forms for the floor slab which will rest on the steel closet-column. After the concrete has been poured, the steel form acts as the reinforcing. The final result is a concrete slab reinforced by steel forms. The accompanying sketch (Fig. 11) shows how such a system might be developed. The rolled edges of the steel forms prevent the concrete from lifting away from the steel, and the alternate straps furnish the bond necessary so that the steel may act as reinforcement. The vermiculite ceiling which is indicated can be made either as plaster or as a series of precast planks.

The scheme just mentioned is intrinsically nothing more than a further development of the steel decking that is already in extensive use. (Fig. 8.) The difference is that the concrete fill is nowadays structurally wasted. Finished with a vermiculite ceiling, these steel decks are already accepted by the strict New York building code as first-class fireproof construction. There is no question, therefore, that such protection is perfectly safe.

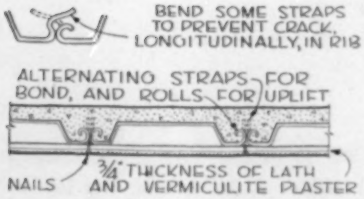

BEND SOME STRAPS TO PREVENT CRACK, LONGITUDINALLY, IN RIB
ALTERNATING STRAPS FOR BOND, AND ROLLS FOR UPLIFT
3/4" THICKNESS OF LATH AND VERMICULITE PLASTER
NAILS

Fig. 11. Introducing modifications in conventional folded steel ceiling section so that the steel serves as reinforcement to the concrete which can then be given credit for structural support instead of being treated just as dead weight

Why not metal-lined exterior walls?

The first use of metal-lined walls has come in industrial buildings. The metal exterior has often been backed up with insulating material. We have made studies for more "genteel" buildings using aluminum planks as wall, and we believe that such a wall is very practical. During wartime, aluminum was not available, and the price situation is still obscure. We feel confident, however, that before very long walls of this type will enter the structural picture. The details shown in Fig. 12 were developed in collaboration with Mr. F. N. Manley of the Johnson and Johnson Company and William Lescaze, architect. There are, of course, innumerable variations possible on the theme, but aluminum pan filled with vermiculite concrete and then an interior wall board would certainly serve all the functions of a wall.

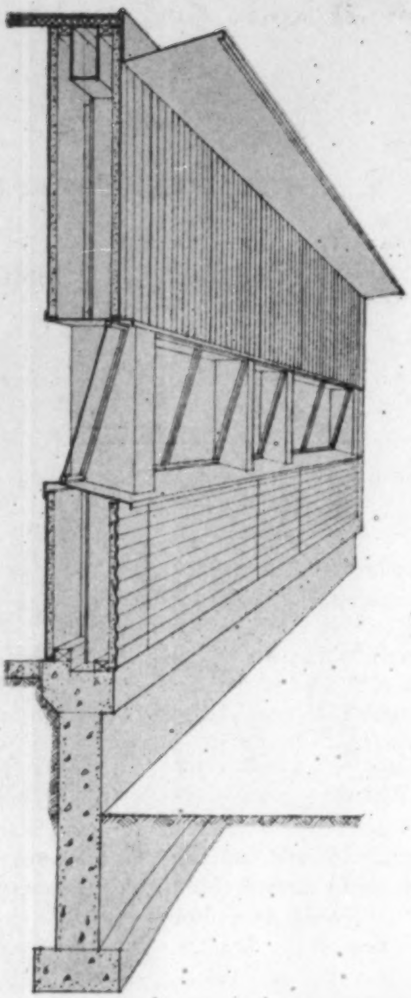


Fig. 12. The exterior wall facing of this building is indicated as corrugated aluminum backed with insulation board. Corrugations in the spandrel run horizontally to give lateral stiffness. From a project developed by the author in collaboration with F. N. Manley of the Johnson and Johnson Company and with William Lescaze, architect

CONCLUSION

The building field is notoriously hampered by centuries of incrusted tradition, but it has been able to respond to urgent pressures, such as the war. Structurally speaking, airplanes have opened a new concept which, like the plane itself, is not earthbound. Apartment construction will remain nearer the ground, but let an important change of condition not pass unnoticed. Tall buildings used to be designed only under circumstances which were either lucrative or luxurious. Our tall apartments of today embrace an entirely new set of tenants, for whom every economy counts. Many a device, from the kitchen stove to the enameled bath tub and the self-service elevator, has spread from low-cost dwellings into the most luxurious ones. In the same way, the construction that is best at the lowest rents may contain highly useful components even where comfort and rents are higher.

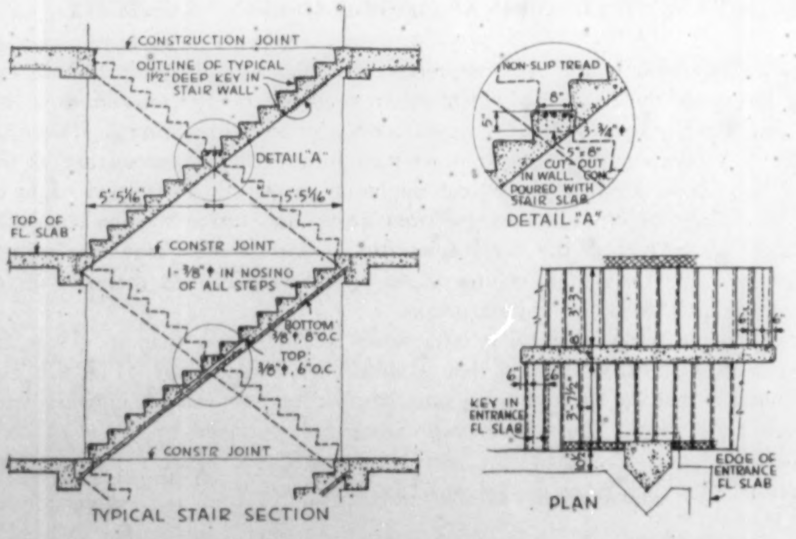

CONSTRUCTION JOINT
OUTLINE OF TYPICAL 1½" DEEP KEY IN STAIR WALL
DETAIL "A"
5'-5 1/16"
5'-5 1/16"
TOP OF FL. SLAB
CONSTR JOINT
1-3/8" ϕ IN NOSING OF ALL STEPS
BOTTOM 3/8" ϕ, 8" O.C.
TOP: 3/8" ϕ, 6" O.C.
CONSTR JOINT
TYPICAL STAIR SECTION
NON-SLIP TREAD
8"
5"
3-3/4" ϕ
5" x 8" CUT OUT IN WALL. CON. POURED WITH STAIR SLAB
DETAIL "A"
3'-3"
6"
6"
6"
6"
3'-7½"
KEY IN ENTRANCE FL. SLAB
EDGE OF ENTRANCE FL. SLAB
PLAN

Fig. 13. Scissors stair frame, proposed Lillian Wald houses, carries out principles espoused by the author. The entire dividing wall is used as a structural column. A hole is left at the central crossing point (detail "A"). Reinforcing is inserted here and the center step each side is used as an intermediate cantilever support for the stair run

Efficiency in Apartment House Heating

No revolutionary changes are to be reported in systems available for immediate use, but advances in control result in a decided improvement in general operation

On the whole, apartment buildings have not been too efficiently heated. One reason for this may be that the speculative apartment has to a certain extent brought down the quality of heating to its own level. This is not to say that apartments do not get enough heat; as a matter of fact, there may be even more apartments getting too much than those with too little. This overheating, along with some at least of the underheating, and most of the excessive cost of heating, is due to a lack of control in one form or another.

By and large, the important advances in heating during the past ten years have been in further developing control (including, but not necessarily confined to, *controls*) of the generation and distribution of heat.

It may prove worthwhile to review here some of the recent developments in heating and air conditioning for apartments which either are, or shortly will be, available. Types of equipment which have a bright future but which do not appear to be entirely practicable for immediate or near-immediate use (such as the heat pump and off-peak electric heating) are excluded. Also excluded are those ideas and devices which are already so widely used as to be conventional.

HEAT SUPPLY EQUALS HEAT LOSS?

The heat supplied to a room must equal the heat lost from that room if the inside air temperature is to be kept constant. This innocent equation is not too easy to satisfy in actual practice; actually, either too much heat or too little heat is usually supplied. The loss of heat is controlled by (1) the area, (2) the transmission coefficients of the outside surfaces, and (3) the inside air temperature—all these being fixed—and the outside temperature, which is a variable. It therefore becomes obvious that the heat supplied to a room must fluctuate in accordance with the outside temperature. This, of course, is not a new idea; but there are still many installations which could considerably profit by adopting a system taking account of temperature fluctuations outside.

Three systems that solve the equation

It is not feasible here to describe all of the various methods of meeting the requirement outlined; but three steam systems should be described in some detail. Each system has its own patented devices. At least one advantage of steam is that it will flow by virtue of its pressure, so that no fan or pump is necessarv to move it.

a. Motor operated steam-pressure control

One of these systems consists essentially of a motor operated steam valve, an outdoor thermostat, a means of manual control, a control cabinet, and traps. On demand of the outside thermostat, the valve is opened a proportionate amount, depending on the outside temperature, allowing steam to enter the main. The radiators are equipped with orifices to compensate for the difference in resistance in each circuit.

The control cabinet contains a mercury tube device to maintain the desired pressure difference between supply and return steam; otherwise fluctuations in steam pressure, vacuum, number of radiators turned on, etc., would throw the system out of balance. The manual control provides means for increasing steam supply (for heating up) or decreasing supply (as during night shut-down).

The orifices in the radiator supply valves introduce steam at high velocity to the radiator, resulting in a turbulent mixing of the air and steam. When the steam supply is throttled, the radiator temperature necessarily drops. The radiators are equipped with traps, but the returns can be open or closed.

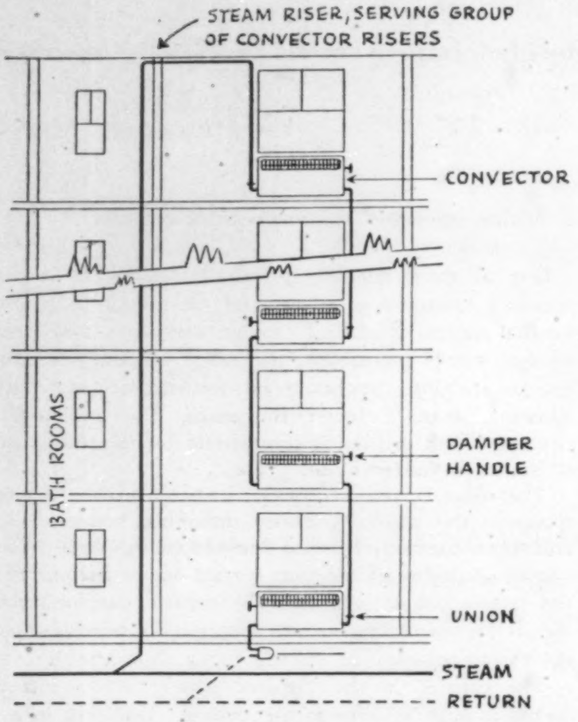
b. Varying the vacuum control

Another system is based on the principle of varying the vacuum under which the steam system is operating, in accordance with the outside temperature. While steam boils at 212 F at ordinary atmospheric temperatures, the boiling temperature drops to 192 F at 5 lb. below atmospheric pressure, and to 133 F at 12½ lb. below atmospheric prsesure. Thus, by increasing the vacuum, a lower steam temperature is obtained and consequently a lower output of connected radiators; and if this vacuum is under the control of an outside thermostat, the basic requirement as previously outlined can be met by this system.

This system consists of one or more graduated motor-operated steam valves, orifices in the radiators, traps on the radiators, a vacuum pump, outside thermostat, and controls. In this system, however, as mentioned, both the steam valve opening and the degree of vacuum are controlled by the heat demand.

c. Downfeed through convectors

A third system is a variation of the foregoing method, intended especially for housing projects and more especially those where cost is of utmost importance. Introduced not long before the war, this system employs subatmospheric steam under the control of an outside thermostat and, in addition, has an unusual feature involving the steam distribution. Steam supply risers are run to the top of the building and are connected to down feed risers. Each down feed riser runs *through* the convectors it feeds.



Riser system, described in accompanying paragraph, is a modification from Parkchester now planned on large projects

Thus, a riser drops from, say, the tenth floor where it is to the right of a window, and steam flows through an under-the-window convector on the ninth floor. On the left end the riser picks up and, carrying steam and condensate, drops to the eighth floor where it picks up another convector to drop again on the right side from the eighth floor. The riser is trapped in the basement, thus eliminating individual convector traps.

The convector itself consists of vertically finned metal chambers, enclosed, with dampers to regulate the volume of heated air allowed to circulate in the room, since the radiators, being in series with the down-feed riser, cannot be shut off by a steam valve. Advantages claimed for this system include low initial and operating costs and simplicity of installation, the last due largely to the down-feed riser feature. This system involves patents.

Hot water zone controls

Hot water systems can also be similarly regulated and zoned. In such cases, the boiler water temperature is kept constant. An outside thermostat, through a suitable control, operates a mixing valve which is connected to (a) a hot water supply main, (b) the return line, and (c) the main to the radiators. When the outside temperature is at the design (say 0°) point, the mixing valve allows only hot water to supply the radiators. When the outside temperature rises to 70°, only cool return water passes to the radiators. At intermediate temperatures, the mixing valve proportions the mixture of cool return water and hot boiler water, allowing the proper ratio (in accordance with the outside temperature) of each to enter radiators.

Zoning of hot water systems is accomplished by motor-operated valves. Constant water temperature is maintained in the boiler, and modulating or proportioning obtained by opening, closing, or partially opening the valve, controllable by an outside or inside thermostat or both.

Thermostat controlled motor valves

Motor-operated valves, for either steam or water, are desirable even where zoning is not contemplated. They can be controlled by an inside or outside thermostat or both, and are available from a number of manufacturers. They are exceptionally advantageous in apartment applications where the weather is mild but variable.

Records of an installation in a Seattle apartment, for example, having 35 tenants, show that under conventional control the heating cost of the building was high, due to over-heating, opening of windows, and excessive running of hot water to obtain hot water due to the exhaustion of the hot water storage. It was not practicable to zone the building; but the system was set up in such a way that the single steam valve was opened at frequent intervals to keep the radiators at the average temperature which was required to heat the building. An outside thermostat was used for this control. When the outdoor temperature reaches 70 F the steam valve is closed at all times; but when the temperature drops to 20 F, the steam valve is open at all times. At intermediate temperatures the valve is opened and closed for proportionate periods. Following the installation of this type of control, a saving of 28.2 per cent in dollars per degree-day was shown and this figure seems to be not unusual where such a control is adapted to an existing apartment.

Using both steam and hot water

Although not common, it is even possible and in some cases advantageous to utilize both steam and hot water. One housing project built shortly before the war, and consisting of a large number of garden type apartment houses, has a central steam generating plant serving remote hot water converters. The idea is that smaller pipe sizes could be employed for handling the steam than for handling hot water, and no pumps were necessary. From the converters hot water is taken to unit heaters located in closet spaces from which warm air is delivered directly through grilles to adjacent rooms or by short sheet metal ducts to other rooms in the apartment. In this way each tenant had some control over his own heating system in the operation of the unit heater in his apartment.

Flexibility with gas equipment

Certain relatively new gas equipment affords designers the opportunity of employing this clean and flexible fuel for individually heated apartments, where the cost of the fuel is not excessive. One of the difficult objectives of apartment heating is to maintain satisfactory heating for occupants with widely varying requirements. For example, elderly people may wish a temperature of 78° whereas some younger tenants may wish temperature as low as 68°. The individual heating system for each apartment using gas enables the landlord to overcome this particular difficulty and thus save considerable heat. Another advantage, in certain cases, is that the meter can be connected separately so that the tenant himself pays his own fuel bill and thus has much more of an incentive for not overheating his apartment; the rent is then correspondingly reduced by the amount of the heating.

By this method a tower-type gas-fired warm air unit or gas boiler is installed in a suitable utility room in the form of a closet (as small as 2½ feet square). Warm air is transmitted by ducts to other rooms (or hot water is piped to radiators) in the apartment. Operating data on a number of projects so heated have yielded quite favorable results, as low as $5.05 a month in a manufactured-gas district. One set of data from Cleveland showed a saving over central hand-fired coal plants, even though gas for water heating and cooking was included in the cost of gas heating.

An additional and sometimes important by-product of this type of system is the freeing of basement space for storage or other purposes.

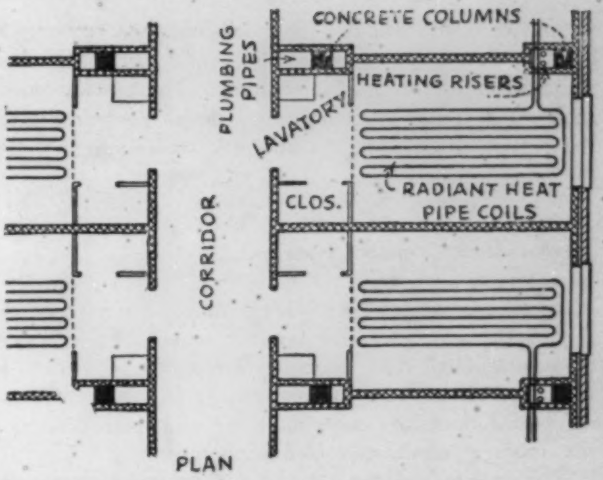
Unit heaters and ventilators

Similar vertical units are available in the form of unit heaters or unit ventilators containing filters and a fan, and fed from a central source of heat, either steam or hot water, with the heated air supplied through ducts to rooms in the apartment.

Still another type unit is a room device resembling a unit ventilator and designed for installation under a window, and containing extended heating surface, a blower, and a filter. The heating surface is supplied with hot water from a central plant in the winter; in summer cold water can be circulated from wells or from a central refrigerating plant, the unit being equipped with a drip pan and drain for carrying away summer condensation.

Baseboard radiator possibilities

A recent development in heat-emitting equipment for houses will undoubtedly find many applications in apartments; this is the baseboard radiator or convector. The baseboard radiator consists of a cast iron radiator of baseboard height and extending the length of at least one wall, made up of sections assembled by nipples as in the case of a conventional radiator. Hot water is fed into one end and the return taken from the other. In the case of the cast iron unit the device is primarily a radiator, the surface being flat. Another type, not yet available for apartments, is actually a very low convector with a flat steel enclosure emitting radiant energy while air is taken in at a slot in the bottom and passed over extending heating surface to be emitted at the top. Both of these types have the advantage of freeing the room of standing radiators, particularly under windows and in corners which occupy valuable space to restrict the decorator. Space saving is a particularly important point in apartments.



Ceiling radiation scheme in conjunction with slab-band structure. Alfred Hopkins Associates, Arch's; Fred N. Severud, Eng.

Radiant floors or ceilings

Radiant heating has not as yet been widely employed in apartment house construction, probably primarily due to the war during which apartment house construction was at a low ebb. However, there is no reason why radiant heating should not be employed in apartments.

Where radiant heating is adopted in multi-story apartments, the use of hot water circulating through pipe or tubing coils in the floor or ceiling would apparently be desirable. In the case of smaller structures, though, good use might be made of warm air, already successfully adapted to houses. In this case, the warm air is circulated in a chamber about 3 in. deep created by a false ceiling; several sheet metal strips, on edge, divide this chamber into passages so that the air is forced into all corners. The ceiling then becomes the radiant-heat-emitting body. Either the supply or return can be centrally located to serve several rooms or a whole apartment.

For hot-water radiant heating, either ferrous or nonferrous pipe can be employed. Whether ceiling panels or floor panels are to be adopted depends on the individual case and also on technical points still somewhat controversial. These systems can be nicely controlled by the mixing valve type of control previously described. Manual control of individual room conditions can be provided for by a valve in the piping to each room.

AIR CONDITIONING

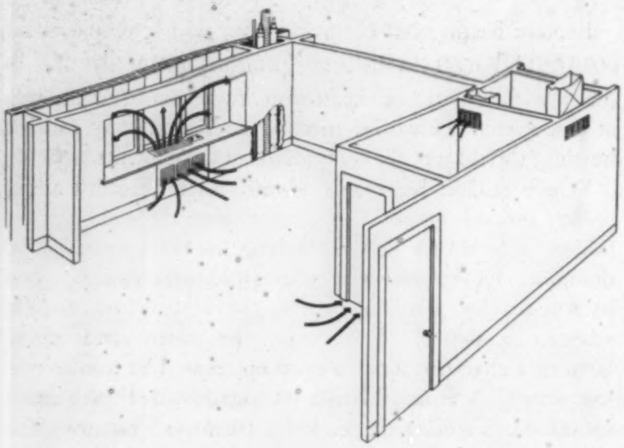
In the extremely northerly regions of the United States there is no particularly heavy demand for summer air conditioning in apartments, but this feature is highly desirable within a few hundred miles of the north boundaries. Air conditioning is of considerable importance in apartments in such regions as St. Louis, Kansas City, and Texas where the number of degree-hours over 85° reaches a maximum, and in the humid southern regions.

A large number of possible combinations of equipment are available for air conditioning apartments in these regions where the contemplated project warrants the expenditure. The simplest method might be to employ room air conditioning units or room coolers furnished either by the owner or the tenant. These self-contained units reject both the heat and moisture to the outside air rather than through drains for the condensation. The postwar room cooler is a considerably improved device compared with the prewar models and, in addition, indications are that the price will be lower.

High velocity central system

Another possibility as a central air conditioning system used both for winter and summer would be the system employing small ducts or pipes carrying high velocity refrigerated air to room units where, by jet action, the cold air would be mixed with room air and introduced into the room at moderately cool temperatures.

This system, designed specifically for multi-story projects, controls the dewpoint of the air in a basement conditioner. At the same point the air is cleaned (and humidified, if necessary). The only air handled by the main conditioner, then, is the *outside* air taken in. The cooled air is forced, at a pressure of 7 or 8 inches of water at a high velocity, through circular conduits not over 6½ inches in diameter, to the rooms. The 6½-inch conduit riser will serve 12 to 15 floors. Since only outside air is being handled, power costs are not excessive. In the room units, chilled water is circulated through heat transfer surface (in summer) to bring the air mixture to the final desired temperature. This chilled water circulation is through a valve controlled by a room thermostat. The same method is used in winter when warm water is circulated. It is claimed that only 15 or 20 per cent as much duct space is used with this system as with the usual duct system.



High-velocity central air conditioning system, showing compact riser replacing bulky supply ducts, saving space (from Carrier)

Heat absorbers

Where a source of heat energy at a lower cost than electrical energy is available, an absorption type refrigeration machine could be successfully employed. Many of these have been used for long periods in the Southwest on a trial basis, and will soon be available nationally.

This device contains a closed circuit of two liquids which require heat to dis-associate them and absorb heat when they combine. The heat can be in the form of steam, produced in any conventional boiler. A heat exchanger is used to absorb the heat from air in a duct system, which is also used for heating in the winter.

Mention has been made of closet units for individual apartment heating. The same principle is used for air conditioning, with any of many types of unit air conditioners, supplied with chilled water in the summer and hot water in the winter from a central plant.

In certain climates, ice for air conditioning is not out of the question, especially where the load factor is low.

INSULATION

Insulation is not, usually, given the same consideration in apartments as in dwellings. There is, however, the same justification for it, and it ordinarily becomes a matter of economics whether insulation is desirable or not.

Entirely aside from the question of probable fuel savings, insulation produces an advantageous condition which has not been sufficiently publicized. This is a feeling of comfort due to the warmer inside surface temperatures on outside walls. When insulation is used, this surface temperature is higher than when it is not used, so that there is less radiation *from* the human body to the outside wall—the reverse of radiant heating. As a result, the body will feel equally comfortable at a slightly lower air temperature.

It can be shown that the physical environment, as measured by operative temperature,* is practically identical in a cubical room with 2 exposed areas or walls, when the air temperature is 72° with the two uninsulated walls having a heat transmission coefficient (U) of 0.32 as with an air temperature of 71.5° and an insulated wall having a coefficient of 0.14. The practical significance of this is that the heat loss equation is reduced from 72—43.6=28.4° to 71.5—43.6=27.9°, or 1.76 per cent on an average for the whole heating season in New York, for example, where the average heating season temperature is 43.6°. This, of course, is in addition to the savings accruing from a decrease in the U value from .32 to .14.

The same reasoning as to radiation applies to windows. A window of large area has a very low surface temperature; in New York, an average of 54.2° with 72° inside and 43.6° outside. As a simple example, let us use the cubical room assumed in the foregoing instance. With two insulated outside walls and with one-half of one outside wall in glass, the operative temperature would be 70.3°. If double windows are substituted, an air temperature of 71° and insulated walls but single windows, will give the same operative temperature as 72° with uninsulated walls and windows.

In most cases the architect would not be especially concerned with this small saving. Instead he is interested in producing the better environment; that is, by maintaining the same air temperature and reducing the radiation loss from the body.

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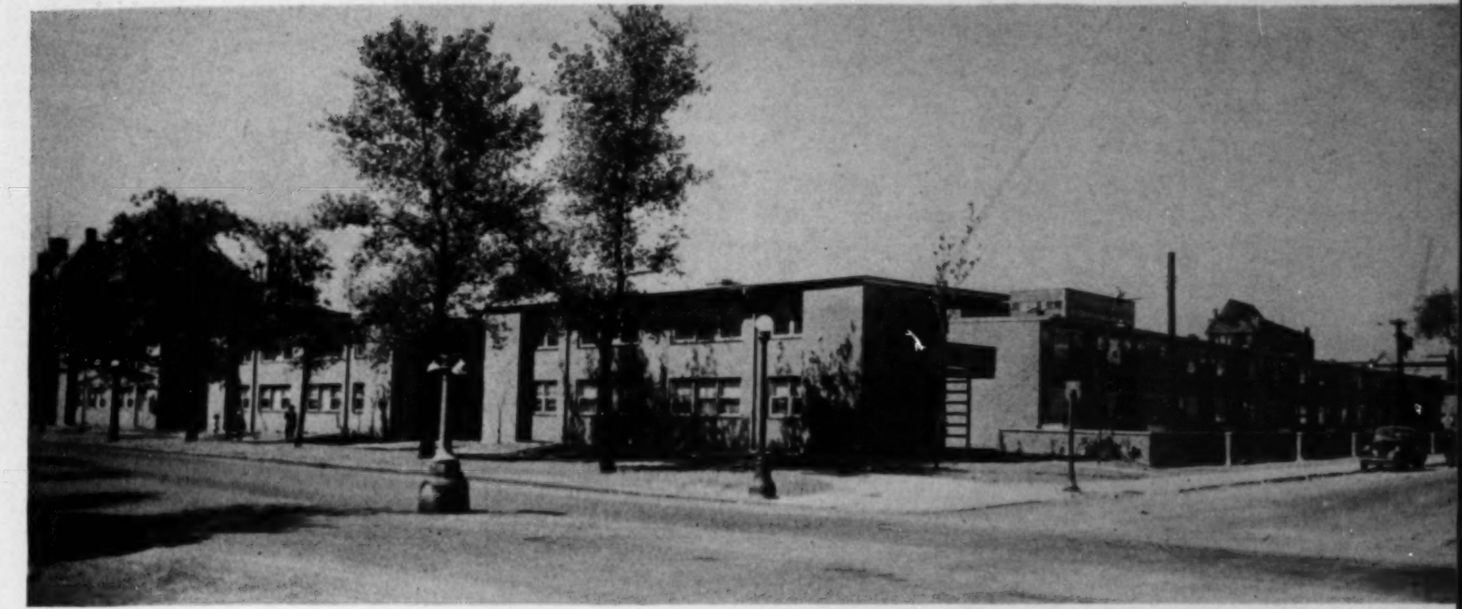
* A term defining the physical environment, and originated at the John B. Pierce Laboratory of Hygiene. Unlike "Effective Temperature," which was based on "cold" walls, this term is a composite of air temperature, air velocity and *mean* radiant temperature of surroundings.

LOW-RENT APARTMENTS OF MINIMUM HEIGHT

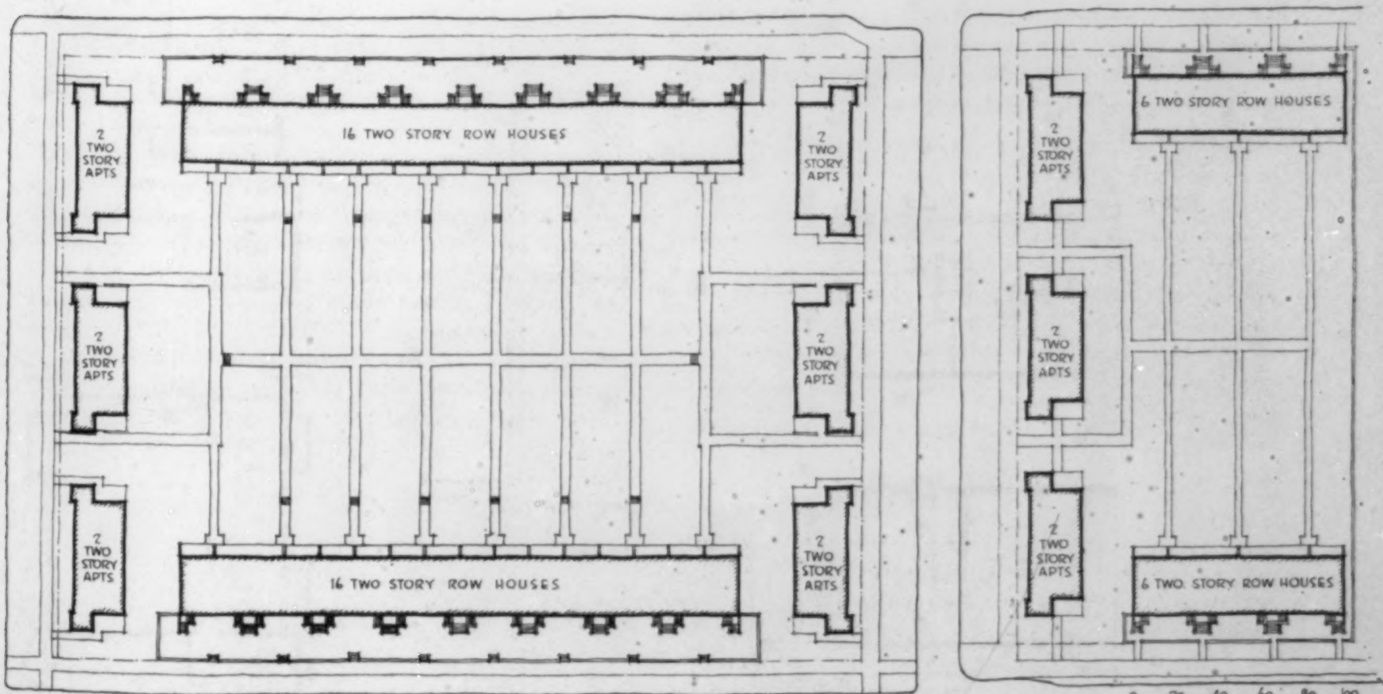
George Washington Carver Apartments, Chicago, Illinois

Skidmore, Owings & Merrill, Architects and Engineers

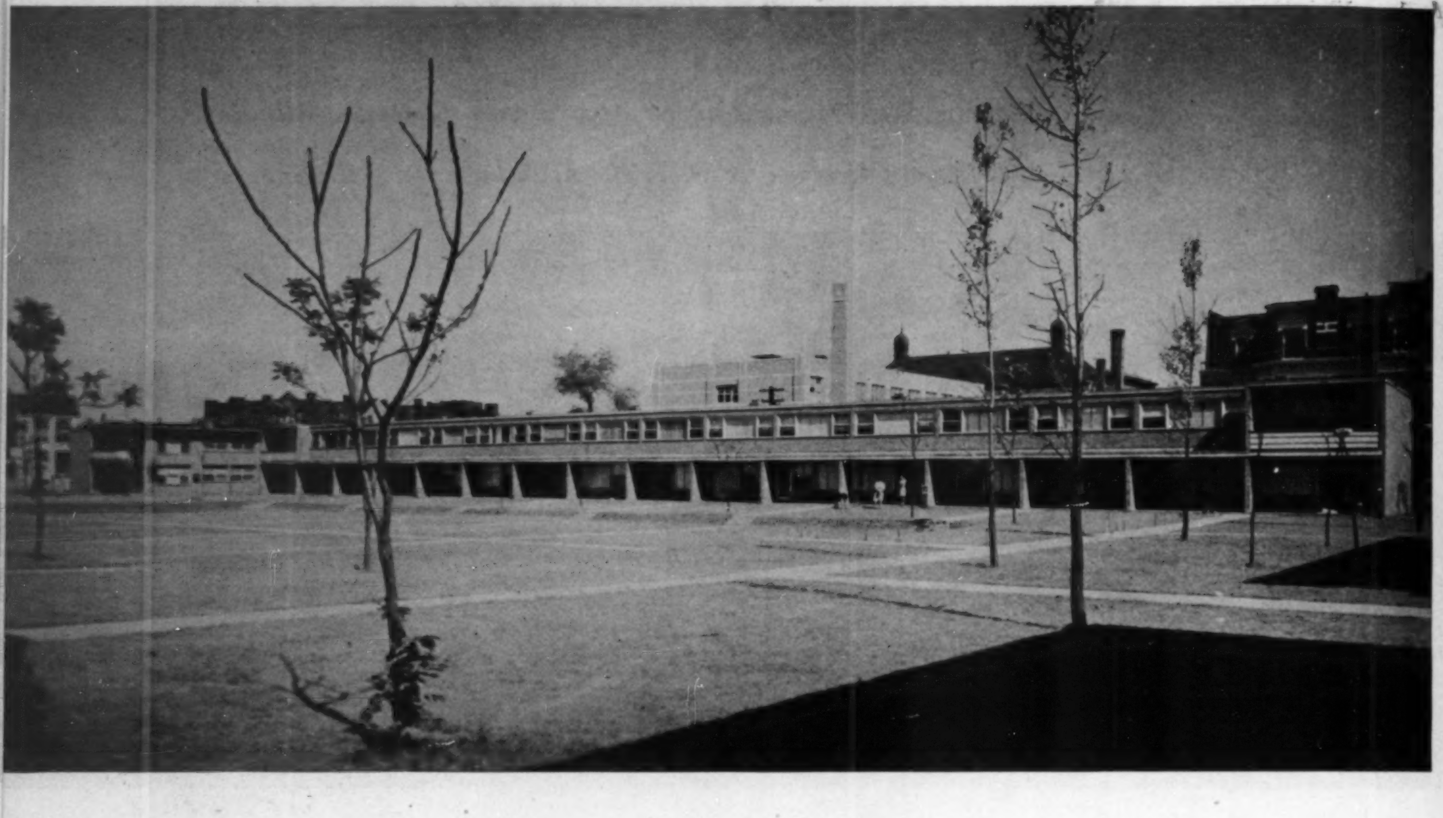


Introduced as a counterpiece to the 13- and 14-story New York apartment types dealt with in the main part of this Building Types Study, we have here a pleasant block and a half of 2-story apartments and row houses on less expensive land in Chicago. A feature of the plot plan is that it eliminates the customary back alley with its associated clutter and substitutes plenty of garden space and easy cross access throught the center of the plot. The two-story apartments have a nice distance from the street and the row houses are given even more front spacing, set off from the street with a front garden wall.

The project is bounded at the right by a temporary wall.

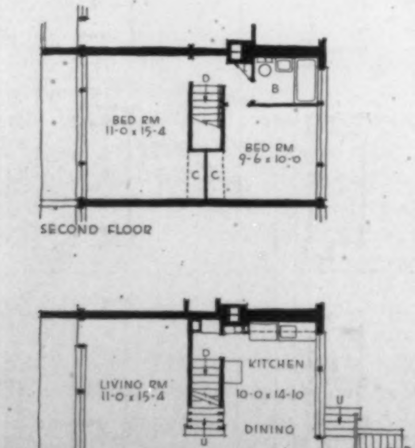

16 TWO STORY ROW HOUSES
2 TWO STORY APTS
2 TWO STORY APTS
2 TWO STORY APTS
2 TWO STORY APTS
2 TWO STORY APTS
2 TWO STORY ARTS
16 TWO STORY ROW HOUSES
6 TWO STORY ROW HOUSES
2 TWO STORY APTS
2 TWO STORY APTS
2 TWO STORY APTS
6 TWO STORY ROW HOUSES
0 20 40 60 80 100

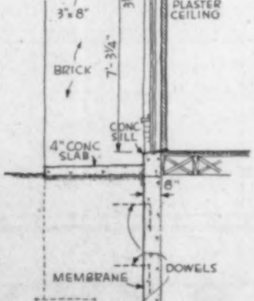
PLOT PLAN

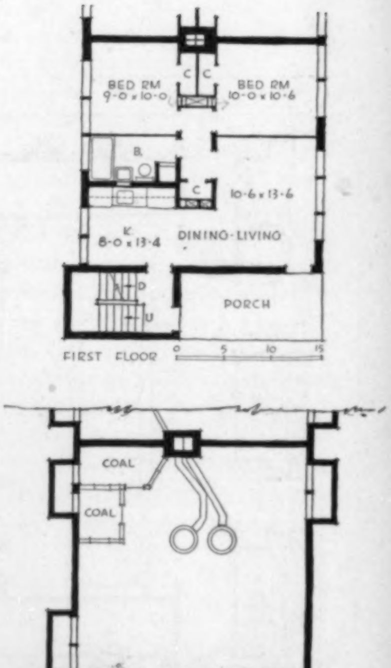


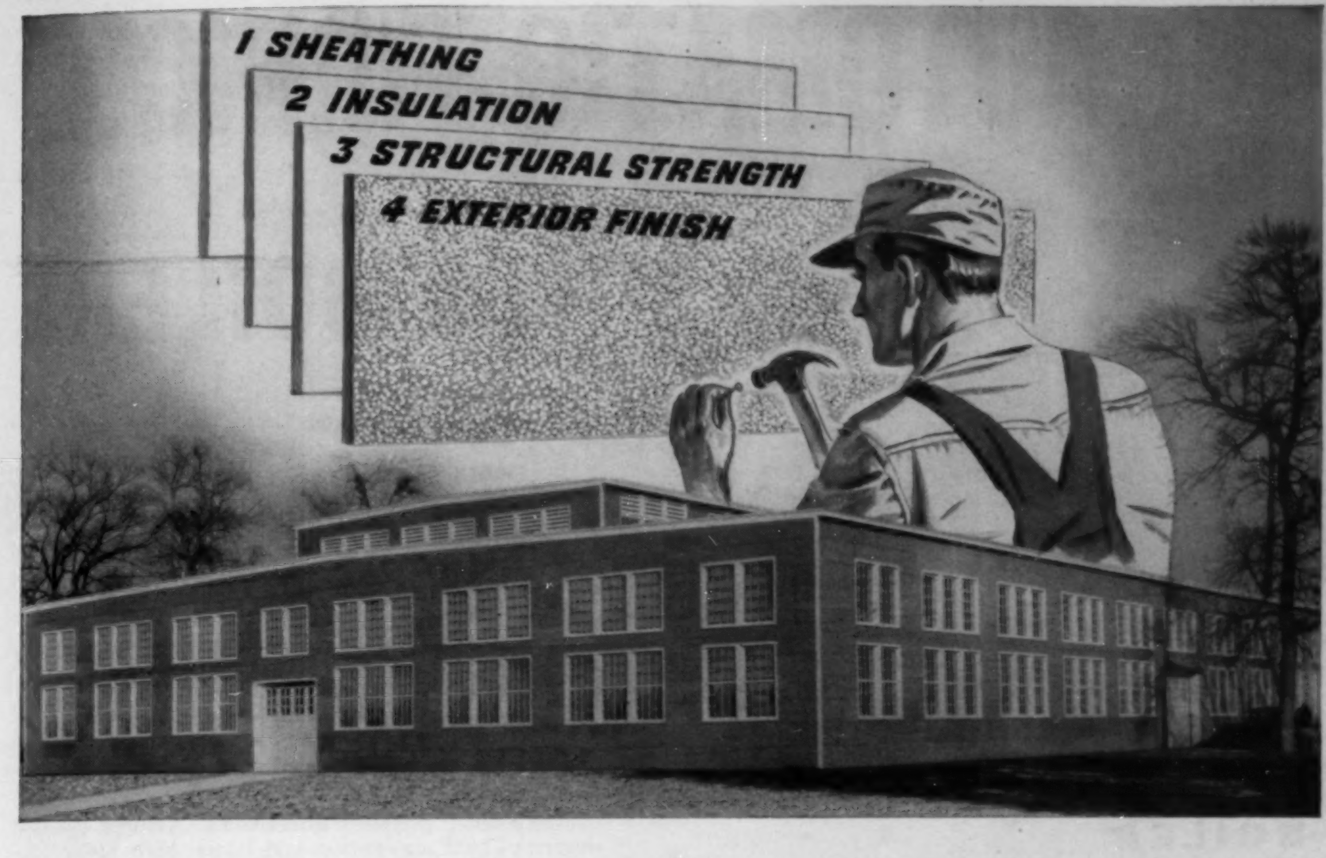
Putting aside the question whether it is the best social policy to segregate Negroes in housing developments of their own, there is no question that these accommodations are vastly superior to those which have been available for them. In the apartments each tenant has his own furnace, one serving the first floor and the other the second. Row houses have a nice feature in the sheltered ground area and the second floor porch.

At left: Row-house plans. Center, typical cross-section showing row-house sheltered area and second-floor porch. At right: Basement and first floor plans of apartment houses; second floor is virtually identical with the first


BED RM
11-0 x 15-4
B
D
BED RM
9-6 x 10-0
C
C
SECOND FLOOR
LIVING RM
11-0 x 15-4
KITCHEN
10-0 x 14-10
DINING
D
U
FIRST FLOOR
0
5
10
15


ROOFING ON WOOD SHEATHING
4"x6"
1"x8"
8"
2"x10"
16" O.C.
4" INSULATION
PLASTER CEILING
BRICK
WOOD BUCK & TRIM
1½"x5½"
7'-3¼"
12" BEV SIDING
2"x4"
16" O.C
7/8" T.& G.
WD SILL
WOOD THRESHOLD
WOOD FL & SUB-FL
3'-0"
1'-2¾"
3¼"
2"x10"
16" O.C
PLASTER CEILING
3"x8"
BRICK
7'-3¼"
CONC SILL
4" CONC SLAB
8"
MEMBRANE
DOWELS
4" CONC SLAB
WALL SECTION


BED RM
9-0 x 10-0
C
C
BED RM
10-0 x 10-6
B
C
10-6 x 13-6
K
8-0 x 13-4
DINING-LIVING
D
U
PORCH
FIRST FLOOR
0
5
10
15
COAL
COAL
U
BASEMENT



ONLY CELO-SIDING GIVES YOU ALL 4 IN 1 APPLICATION!

Yes . . . Celo-Siding's 4 major advantages in 1 material are unmatched when the problem is one of speedy, economical construction.

That's why more and more progressive architects specify Celo-Siding in their plans for factories, warehouses, farm buildings and garages. In one application they achieve sheathing, insulation, exterior finish and structural strength.

Obviously, you can build more in less time when there is but one material to buy and apply. When Celo-Siding is nailed to the framework and caulked, the job is finished. That means a saving in labor, too!

Best of all—Celo-Siding requires no painting, no maintenance. Its mineral-granule surface presents a good looking, durable finish that withstands rain, snow, sleet and broiling sun.

Equally important is the remarkable insulating value of Celo-Siding. It provides heat-retarding walls that make interiors warmer in winter, cooler in summer, and easier to heat.

Write to Celotex, Dept. AR-146, Chicago 3, Illinois, for full particulars as to how Celo-Siding may be adapted to *your* building problem.

Quick Facts ON CELO-SIDING

Tongue and Groove joint on long edges of 2 ft. x 8 ft. panels.

Core of genuine Celotex Cane Fibre Board furnishes structural strength and insulation.

All edges and sides sealed against moisture by coating of asphalt.

Extra coating of asphalt on exterior side.

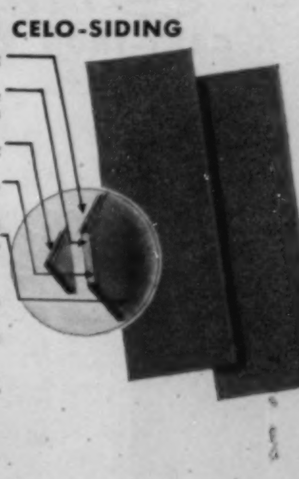
Exterior surface of firmly imbedded mineral granules, providing durable, colorful finish.

Colors: Green or Bufftone.

Sizes: ⅝" thickness—4 ft. x 8 ft. with square edges.

⅞" thickness—2 ft. x 8 ft. with T & G joints on long edges.

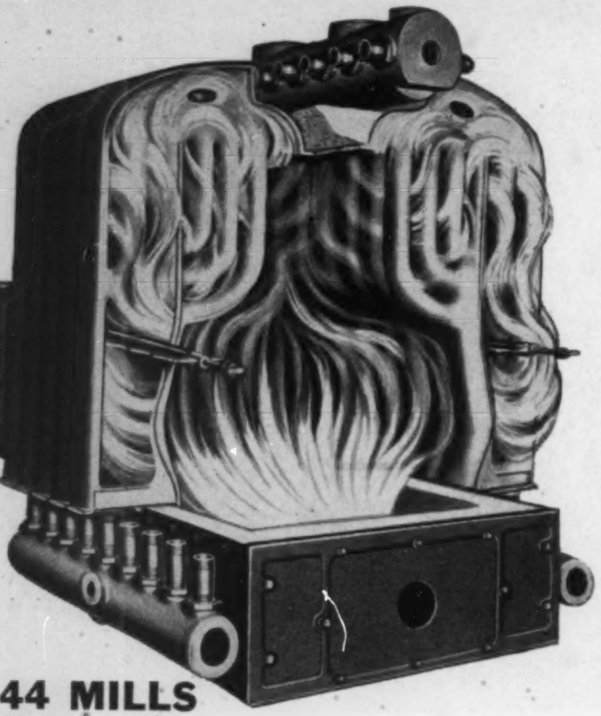
⅞" thickness—4 ft. x 8 ft. and 4 ft. x 10 ft. with square edges.



CELOTEX
REG. U.S. PAT. OFF.
BUILDING PRODUCTS

THE CELOTEX CORPORATION • CHICAGO 3, ILLINOIS

FOR AUTOMATIC FIRING...



44 MILLS BOILER

"Mills" boilers have capacities from 600 sq. ft. to 11,400 sq. ft. of installed steam radiation.

MILLS BOILERS

take the lead!

For years H. B. SMITH "MILLS" boilers have been acknowledged as the leaders in their field. Now, more and more engineers are coming to realize the reasons *why* these units are uniquely suited to installations where top performance with oil, gas or stoker is a No. 1 requirement.

Here are just a few "Mills" exclusive features. Think them over carefully before selecting a boiler for that important job you are figuring now.

- ✓ — *WATER TUBE construction* promotes efficient water circulation, fast steaming.
- ✓ — *MORE prime heating surface* than any other boiler of comparable physical dimensions. Assures a high degree of heat absorption and hence high operating efficiencies at 100% of rating.
- ✓ — *MADE of rugged cast iron* for long service, low maintenance.
- ✓ — *HEADER TYPE CONSTRUCTION* minimizes possibility of mid-season breakdown.
- ✓ — *CONVERTIBLE* from one fuel to another both easily and inexpensively.

H.B. *Smith*
CAST-IRON BOILERS

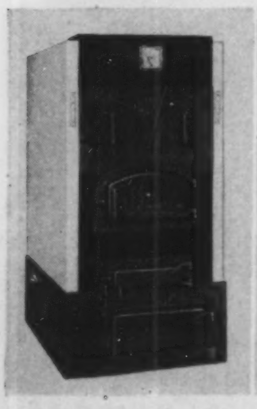
●

Write for free catalogue

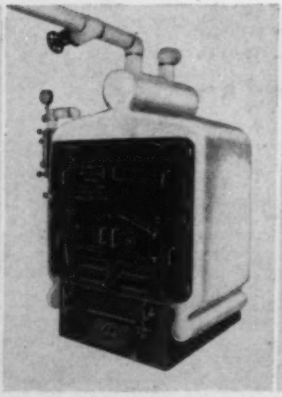
THE H. B. SMITH CO., INC. WESTFIELD, MASS.

Offices and Sales Representatives in Principal Cities

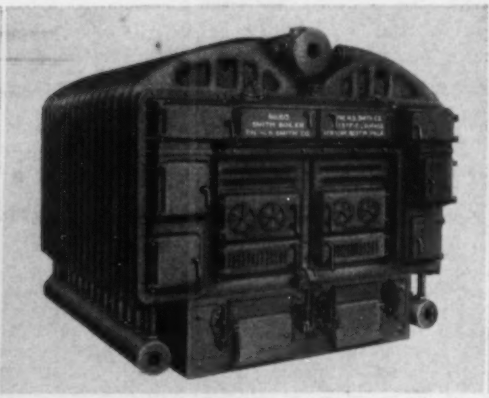
Smith-Mills Residential Units



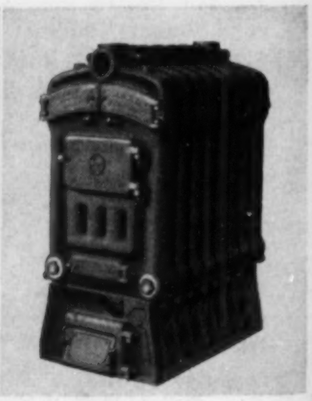
Mills Boilers for Medium Size Jobs



42 and 60 Smith Boilers for Large Installations

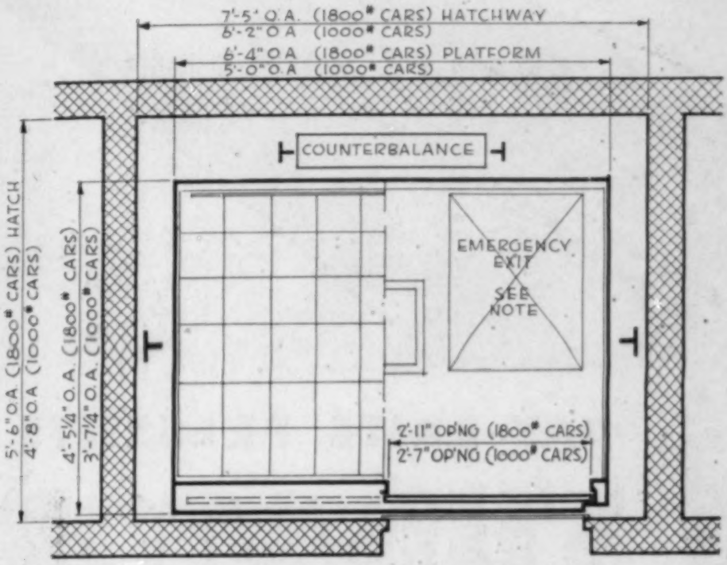


Smith Hot Water Supply Boilers



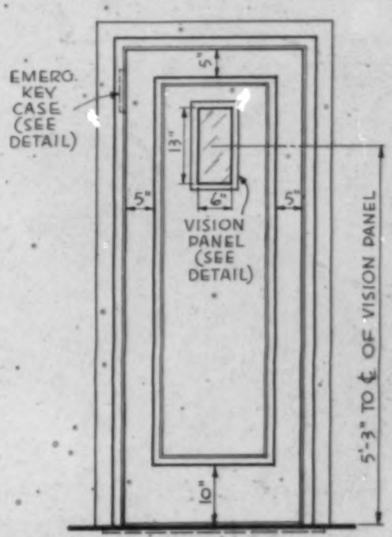
ELEVATOR CAB DETAILS

From apartment house planning standards of the New York City Housing Authority, W. C. Vladeck, Chief of Project Planning

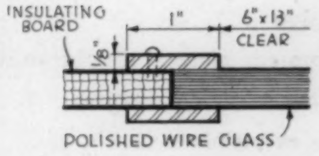

7'-5" O.A. (1800# CARS) HATCHWAY
6'-2" O.A. (1000# CARS)
6'-4" O.A. (1800# CARS) PLATFORM
5'-0" O.A. (1000# CARS)
COUNTERBALANCE
EMERGENCY EXIT SEE NOTE
5'-6" O.A. (1800# CARS) HATCH
4'-8" O.A. (1000# CARS)
4'-5¼" O.A. (1800# CARS)
3'-7¼" O.A. (1000# CARS)
2'-11" OP'NG (1800# CARS)
2'-7" OP'NG (1000# CARS)

HALF FLOOR & CEILING PLAN
SCALE 3/8" = 1'-0"

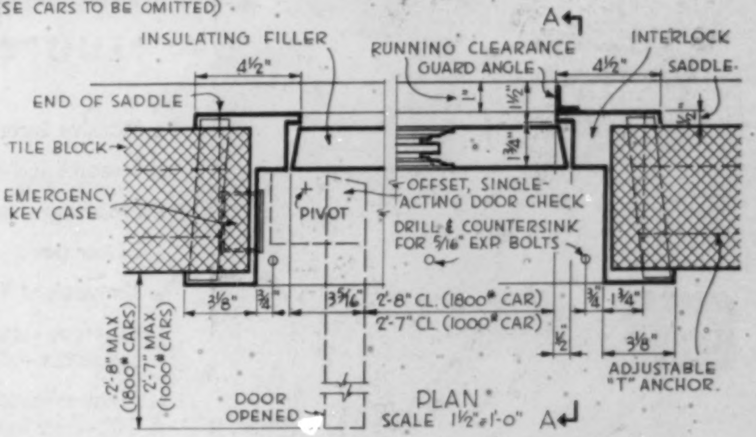
NOTE CARS IN DOUBLE SHAFTS SHALL HAVE A SWING SIDE EMERGENCY EXIT DOOR ONE PER CAR AS REQUIRED BY THE BUILDING CODE (ROPE LADDERS IN THESE CARS TO BE OMITTED)


EMERG. KEY CASE (SEE DETAIL)
5"
13"
5"
6"
5"
VISION PANEL (SEE DETAIL)
5'-3" TO ℄ OF VISION PANEL
10"

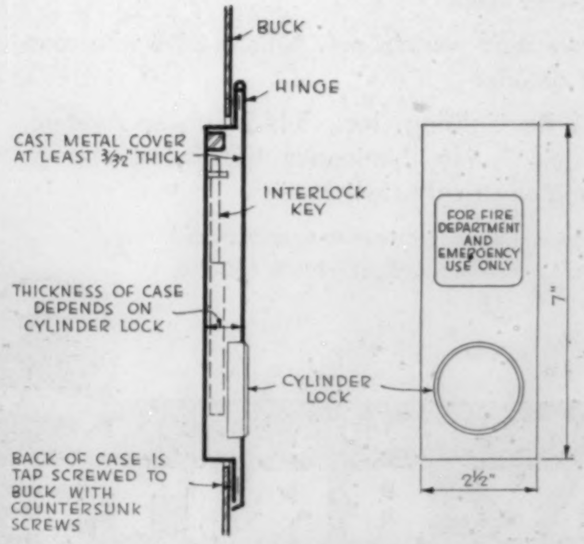
ELEVATION OF DOOR
SCALE 3/8" = 1'-0"


INSULATING BOARD
1"
6" x 13" CLEAR
1/8"
POLISHED WIRE GLASS

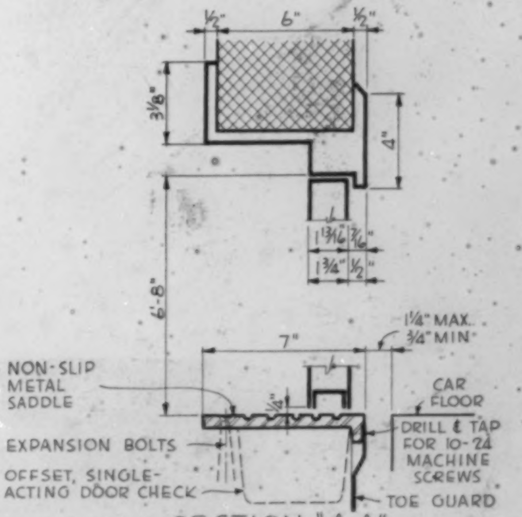
DETAIL - VISION PANEL
HALF FULL SIZE


A
INSULATING FILLER
RUNNING CLEARANCE
INTERLOCK
4½"
GUARD ANGLE
4½"
SADDLE
END OF SADDLE
1½"
TILE BLOCK
1⅜"
EMERGENCY KEY CASE
PIVOT
OFFSET, SINGLE-ACTING DOOR CHECK
DRILL & COUNTERSINK FOR 5/16" EXP BOLTS
3⅛"
¾"
3 5/16"
2'-8" CL. (1800# CAR)
2'-7" CL. (1000# CAR)
¾"
1¾"
3⅛"
½"
2'-8" MAX (1800# CARS)
2'-7" MAX (1000# CARS)
ADJUSTABLE "T" ANCHOR
DOOR OPENED
A

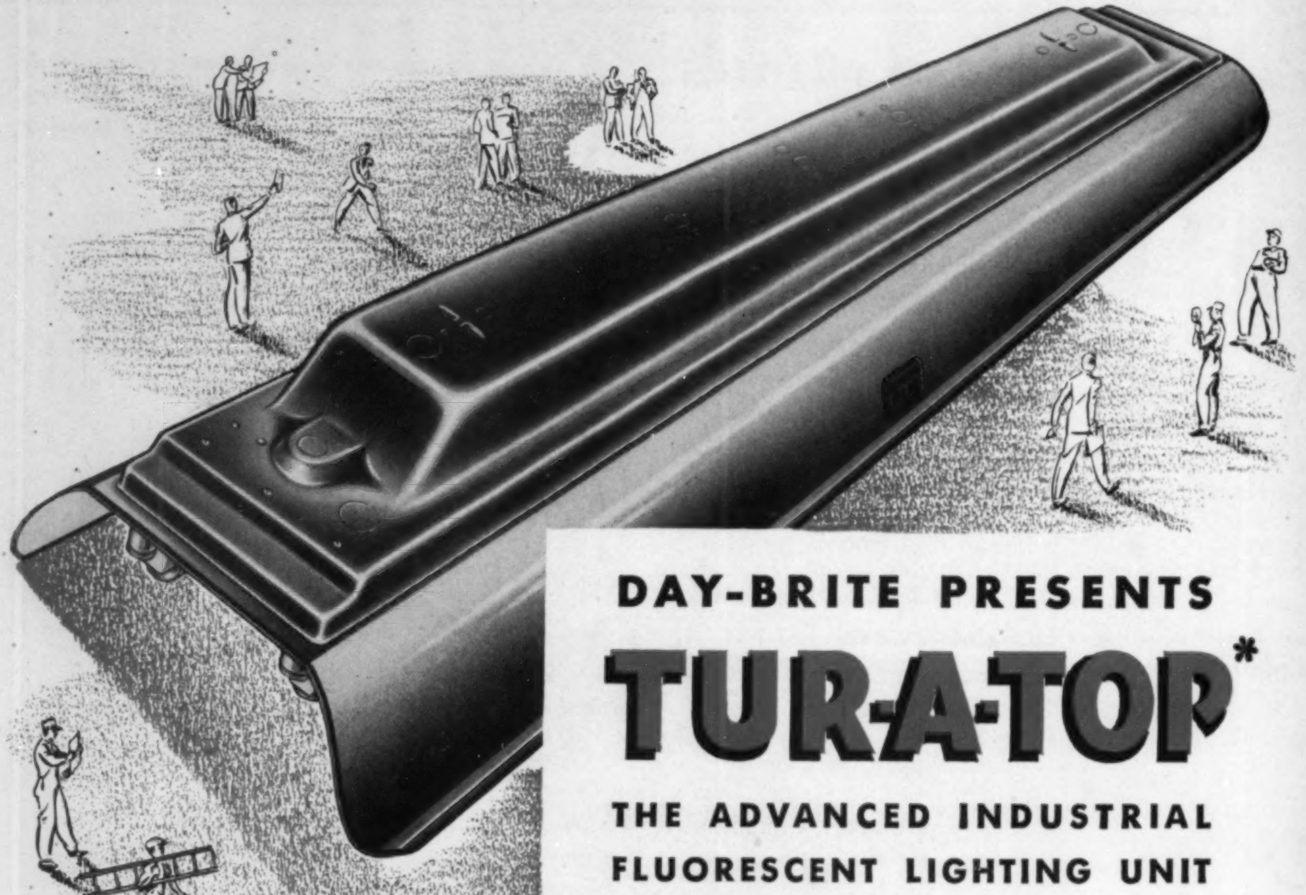
PLAN
SCALE 1½" = 1'-0"


BUCK
HINGE
CAST METAL COVER AT LEAST 3/32" THICK
INTERLOCK KEY
THICKNESS OF CASE DEPENDS ON CYLINDER LOCK
CYLINDER LOCK
BACK OF CASE IS TAP SCREWED TO BUCK WITH COUNTERSUNK SCREWS
FOR FIRE DEPARTMENT AND EMERGENCY USE ONLY
7"
2½"

DETAIL - CASE FOR
INTERLOCK EMERGENCY KEY


½"
6"
½"
3⅛"
4"
1 3/16"
7/16"
1¾"
½"
6'-8"
1¼" MAX.
¾" MIN.
7"
NON-SLIP METAL SADDLE
¼"
CAR FLOOR
EXPANSION BOLTS
DRILL & TAP FOR 10-24 MACHINE SCREWS
OFFSET, SINGLE-ACTING DOOR CHECK
TOE GUARD

SECTION "A-A"
"SCALE 1½" = 1'-0"



DAY-BRITE PRESENTS

TUR-A-TOP*

THE ADVANCED INDUSTRIAL FLUORESCENT LIGHTING UNIT

- Massive turret-type design
- Streamlined housings are one piece of die-drawn steel
- No danger of misalignment or loose parts
- Fewer parts—all easily accessible
- Convenient for pipe or chain suspension
- Open or closed end, life-long porcelain enameled steel reflectors—rigidly fastened but quickly detachable
- Fixtures available for two and three 40-watt or two 100-watt lamps

May we send you our new Bulletin 30-B with complete details?

Day-Brite Lighting, Inc., 5465 Bulwer Avenue, St. Louis 7, Mo. Nationally distributed through leading electrical supply houses.

In Canada: address inquiries to Amalgamated Electric Corporation, Ltd., Toronto 6, Ontario.

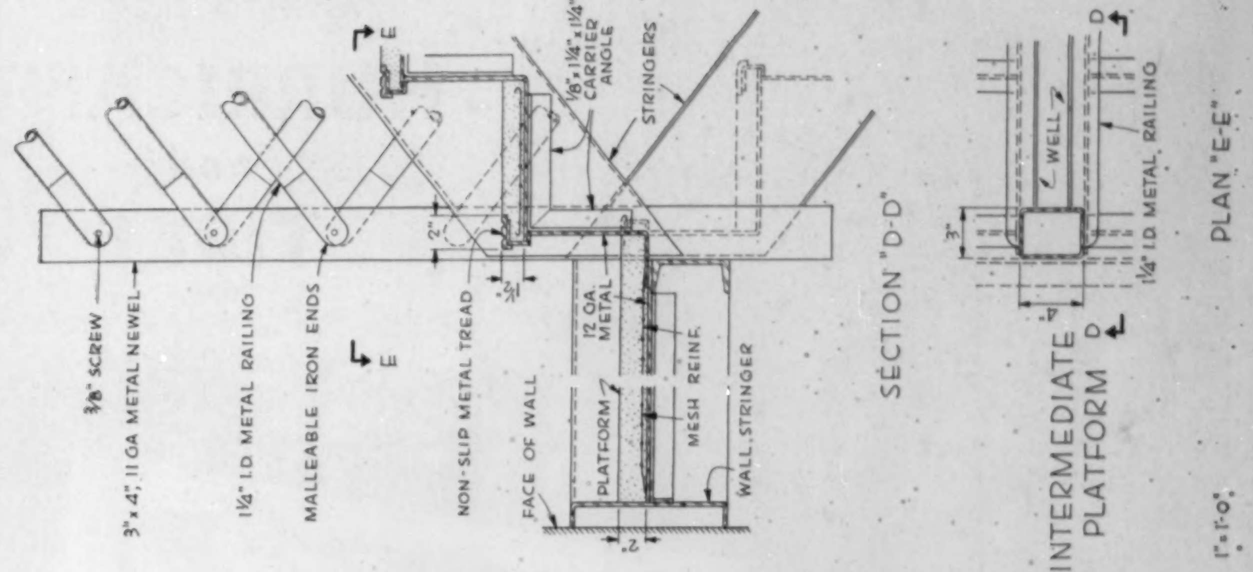
*Patent No. D-142488

IT'S EASY TO SEE WHEN IT'S

DAY-BRITE *Lighting*

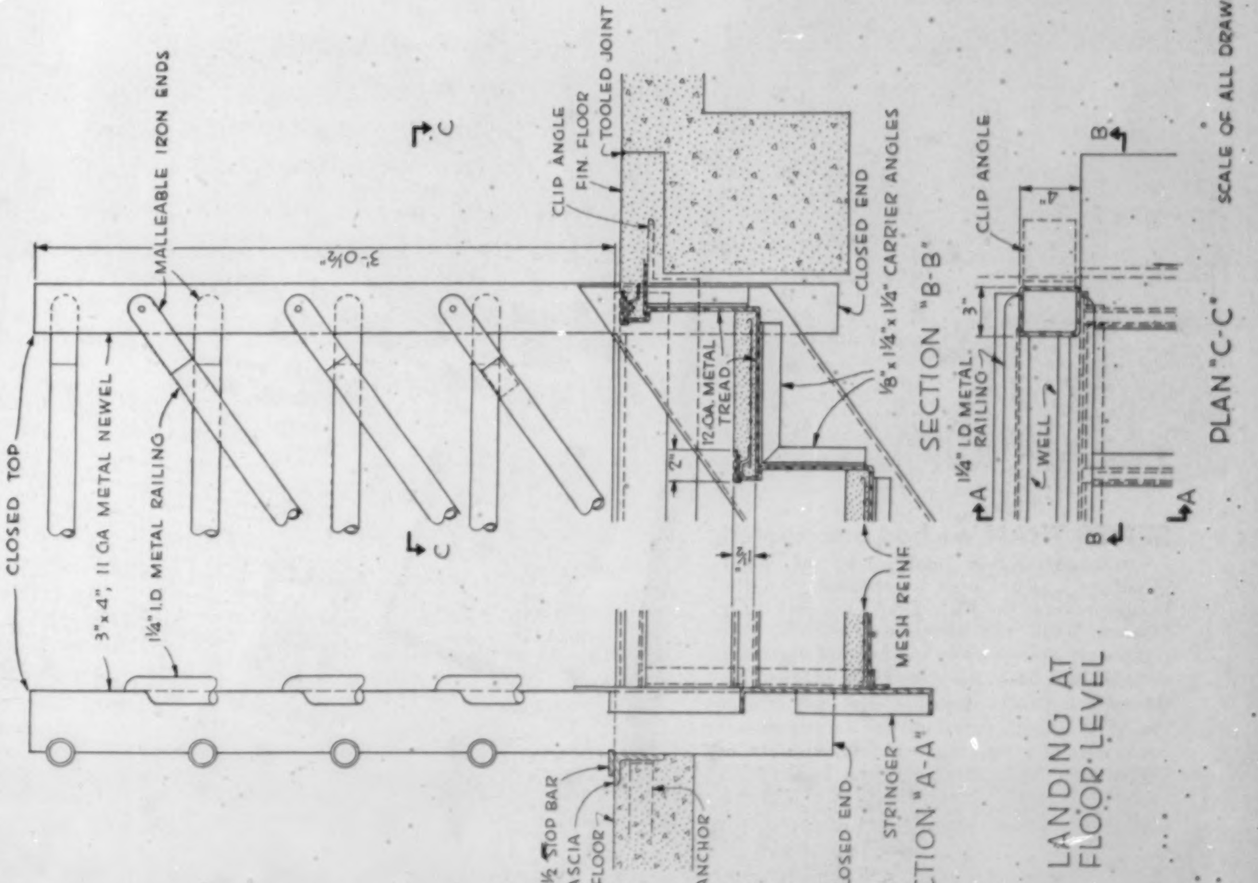
STEEL STAIR DETAILS

From apartment house planning standards of the New York City Housing Authority, W. C. Vladeck, Chief of Project Planning


⅜" SCREW
3"x 4", 11 GA METAL NEWEL
1¼" I.D METAL RAILING
MALLEABLE IRON ENDS
NON-SLIP METAL TREAD
FACE OF WALL
PLATFORM
12 GA. METAL
MESH REINF.
WALL STRINGER
⅛"x 1¼"x 1¼" CARRIER ANGLE
STRINGERS
2"
½"
2"
E
E
SECTION "D-D"
3"
WELL
1¼" I.D METAL RAILING
D
D
PLAN "E-E"

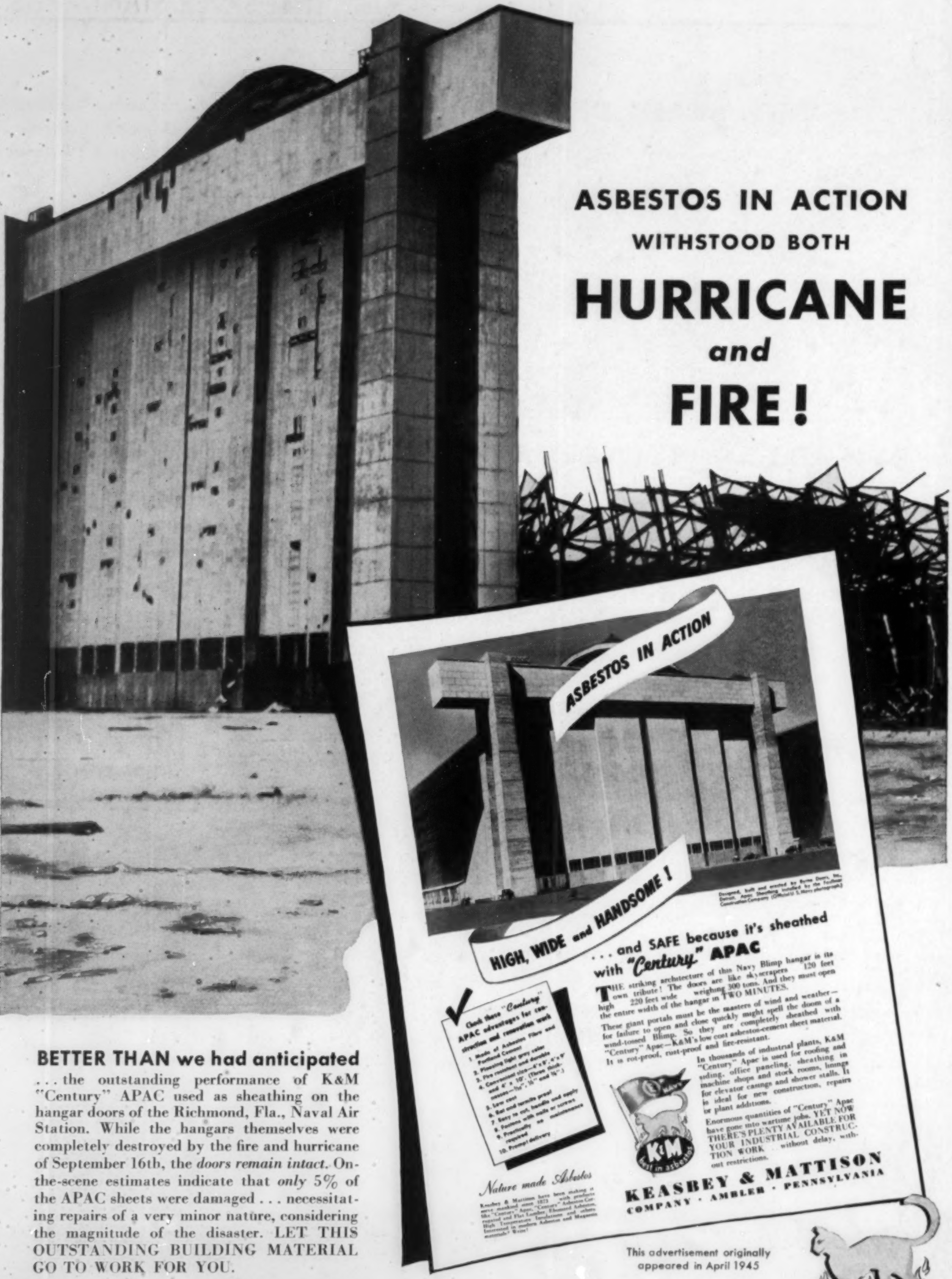
INTERMEDIATE PLATFORM

SCALE OF ALL DRAWINGS 1"=1'-0"


CLOSED TOP
3"x 4", 11 GA METAL NEWEL
1¼" I.D METAL RAILING
MALLEABLE IRON ENDS
3'-0½"
C
C
CLIP ANGLE
FIN. FLOOR
TOOLED JOINT
CLOSED END
⅛"x 1¼"x 1¼" CARRIER ANGLES
12 GA. METAL TREAD
2"
½"
MESH REINF.
⅜"x 1½ STOP BAR
FASCIA
FIN. FLOOR
ANCHOR
CLOSED END
STRINGER
SECTION "A-A"
SECTION "B-B"
CLIP ANGLE
4"
3"
1¼" I.D METAL RAILING
WELL
A
A
B
B
PLAN "C-C"

LANDING AT FLOOR LEVEL

ASBESTOS IN ACTION WITHSTOOD BOTH HURRICANE *and* FIRE!



ASBESTOS IN ACTION

Designed, built and erected by Byrne Doors, Inc., Detroit. Apac Sheathing installed by the [illegible] Construction Company. (Official U. S. Navy photograph.)

HIGH, WIDE and HANDSOME!

. . . and SAFE because it's sheathed with "*Century*" APAC

THE striking architecture of this Navy Blimp hangar is its own tribute! The doors are like skyscrapers . . . 120 feet high . . . 220 feet wide . . . weighing 300 tons. And they must open the entire width of the hangar in TWO MINUTES.

These giant portals must be the masters of wind and weather—for failure to open and close quickly might spell the doom of a wind-tossed Blimp. So they are completely sheathed with "Century" Apac—K&M's low cost asbestos-cement sheet material. It is rot-proof, rust-proof and fire-resistant.

In thousands of industrial plants, K&M "Century" Apac is used for roofing and siding, office paneling, sheathing in machine shops and stock rooms, linings for elevator casings and shower stalls. It is ideal for new construction, repairs or plant additions.

Enormous quantities of "Century" Apac have gone into wartime jobs. YET NOW THERE'S PLENTY AVAILABLE FOR YOUR INDUSTRIAL CONSTRUCTION WORK . . . without delay, without restrictions.

✓ Check these "*Century*" APAC advantages for construction and renovation work

1. Made of Asbestos Fibre and Portland Cement
2. Pleasing light grey color
3. Fire resistant and durable
4. Convenient size—4' x 8', 4' x 9' and 4' x 10'. (Three thicknesses—3/16", 1/4" and 3/8".)
5. Low cost
6. Rat and termite proof
7. Easy to cut, handle and apply
8. Fastens with nails or screws
9. Practically no maintenance required
10. Prompt delivery

Nature made Asbestos

Keasbey & Mattison have been making it serve mankind since 1873 . . . with products like "Century" Apac, "Century" Asbestos Corrugated and Flat Lumber, Ebonized Asbestos, High Temperature Insulations and others. Interested in modern Asbestos and Magnesia materials? Write!

KEASBEY & MATTISON
COMPANY · AMBLER · PENNSYLVANIA

This advertisement originally
appeared in April 1945

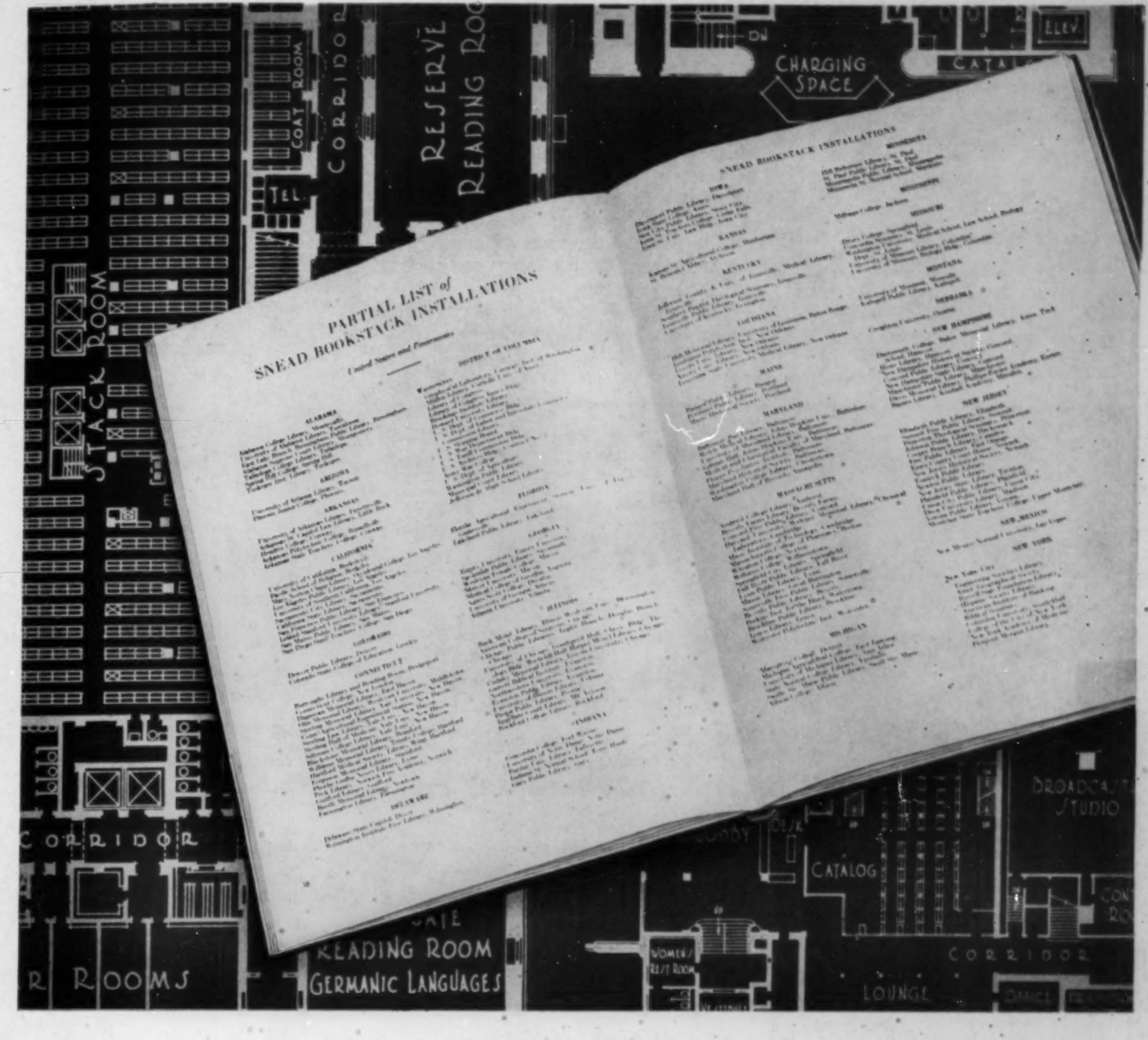
BETTER THAN we had anticipated

. . . the outstanding performance of K&M "Century" APAC used as sheathing on the hangar doors of the Richmond, Fla., Naval Air Station. While the hangars themselves were completely destroyed by the fire and hurricane of September 16th, the *doors remain intact.* On-the-scene estimates indicate that *only* 5% of the APAC sheets were damaged . . . necessitating repairs of a very minor nature, considering the magnitude of the disaster. LET THIS OUTSTANDING BUILDING MATERIAL GO TO WORK FOR YOU.

KEASBEY & MATTISON

COMPANY · AMBLER · PENNSYLVANIA

K&M best in asbestos


CHARGING SPACE
ELEV.
DN
COAT ROOM
CORRIDOR
RESERVE READING ROOM
TEL.
STACK ROOM
CORRIDOR
READING ROOM
GERMANIC LANGUAGES
R ROOMS
CATALOG
WOMEN'S REST ROOM
LOUNGE
CORRIDOR
BROADCAST STUDIO

PARTIAL LIST of SNEAD BOOKSTACK INSTALLATIONS

SNEAD BOOKSTACK INSTALLATIONS

The World's Outstanding Libraries Equipped with

SNEAD BOOKSTACKS and MOBILWALLS

The list of libraries equipped with Snead Bookstacks and Mobilwalls reads like a "Who's Who" of the world's outstanding libraries.

Snead & Company designed and built the metal bookstacks for the original Library of Congress almost 50 years ago, and since then, many of the major improvements in stack construction were developed by this progressive organization.

A wealth of experience gained through generations of library specialization provides ample assurance against costly mistakes due to unsound design, and may also save you the necessity of duplicating expensive development work already performed successfully for others.

Whether you are planning a new library, a rearrangement, or even the simple addition of a few sections, it will pay you to consult us. We will gladly cooperate in the preparation of plans and specifications without obligation.

Send for the Snead Bookstack Catalog containing valuable facts, plans, engineering data, and illustrations.

Since 1849, the Snead symbol of lasting beauty, quality and progress in metal construction

SNEAD & Company . . . . . . FOUNDED 1849

Designers, manufacturers and erectors of library bookstacks and steel partitions

Sales Office: 96 Pine Street, JERSEY CITY 4, N. J. Main Office and Plant: ORANGE, VA.

welded steel frame, brick exterior and continuous sash in side walls and monitors. Air conditioned offices at one side of the principal facade will be balanced by truck loading docks on the other.

Plastics Laboratory

Plans for a new plastics laboratory at its Parlin, N. J., plant have been announced by Hercules Powder Co. The laboratory will serve as headquarters for the company's development and research work on plastics. It will have facilities for compounding finished plastics for testing, and will be set up in such a way that customers who buy basic materials from the company can see new techniques applicable to their work demonstrated, and can work with the laboratory chemists on their processing problems. Plans include several constant-temperature rooms in which plastics qualities can be tested under conditions specified by customers. Both cold and heat tests will be possible, with the temperatures in the testing rooms ranging from minus 70° to plus 180° F.

The building will be T-shaped, with the head of the T one story high and the leg two stories high. Laboratories will be located on both floors. Offices, a conference room and high-temperature equipment will be on the second floor, while cold-storage rooms, electrical equipment rooms and a machine shop will be on the first floor. Walls will be tile-lined, floors concrete. Air will be filtered to insure freedom from contamination by dust and dirt. All electrical equipment will be explosion-proof.

Offices Addition

E. I. duPont deNemours & Co., Inc., has announced plans for the construction of an 18-story third section to the Nemours Building in Wilmington, Del. The building will be completely air conditioned. Voorhees, Walker, Foley and Smith are the architects, with Frederick A. Godley as associate; the contract has been awarded to the Turner Construction Co.

Weaving Plant

The Lumite Division of the Chicopee Mfg. Corp. of Georgia has announced plans for a new weaving plant at Cornelia, Ga., for which ground was broken late in October.

A one-story building of modern design, the new plant will be devoted exclusively to the weaving of Lumite plastic fabrics, is expected to be in operation early in 1946. L. W. Robert & Co., of Atlanta, are the engineer-designers; Daniel Construction Co., Greenville, S. C., the contractor.

STANDARDS

Light Gage Steel

Research which the Committee on Building Codes of American Iron and Steel Institute has been sponsoring since 1939 at Cornell University has provided sufficient data for presentation soon to the engineering profession in a specification for the design of light gage steel structural members, it has been announced. When available, the specification will provide a basis upon which to design with light gage sheet and strip steel. It will include provisions which distinguish between the behavior of stiffened and unstiffened flanges and their relative load carrying capacities.

Dimensional Coordination

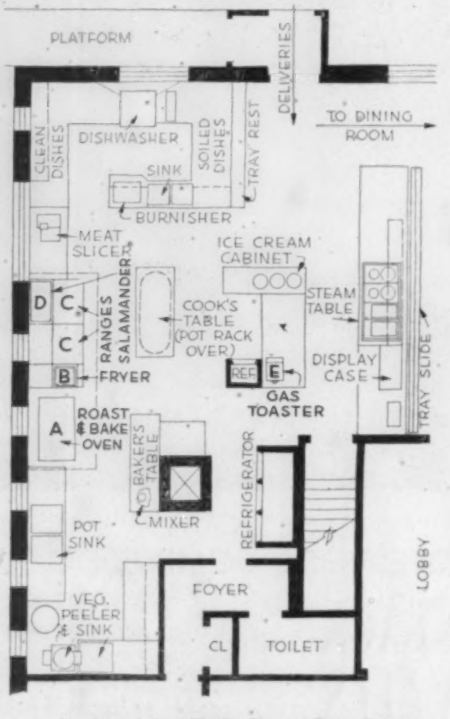
The American Standards Association has approved an American Standard on the basis of which building ma-

(Continued on page 104)

KITCHEN PLAN NO. 31: **Thirty-first of a series of successful mass - feeding kitchen plans.**

Designed to serve several hundred daily meals at Robinson Hall, University of Vermont, this kitchen plan is notable for its compact flexibility.

KEEP FOR HANDY REFERENCE


PLATFORM
DELIVERIES
TO DINING ROOM
CLEAN DISHES
DISHWASHER
SOILED DISHES
TRAY REST
SINK
BURNISHER
MEAT SLICER
ICE CREAM CABINET
D
C
SALAMANDER
RANGES
COOK'S TABLE (POT RACK OVER)
STEAM TABLE
C
B
FRYER
REF
E
GAS TOASTER
DISPLAY CASE
TRAY SLIDE
A
ROAST & BAKE OVEN
BAKERS TABLE
MIXER
REFRIGERATOR
POT SINK
LOBBY
FOYER
VEG. PEELER & SINK
CL
TOILET

COOKING EQUIPMENT USED:

- (a) 1 No. 959 Blodgett gas-fired roasting and baking oven
- (b) 1 Gas-fired deep fat fryer
- (c) 2 Heavy duty gas-fired ranges
- (d) Salamander broiler
- (e) 1 Gas-fired toaster

Designed by: H. P. Rung, Consultant
Kitchen Equipment
Nathan Straus-Duparquet, Inc., New York, N. Y.

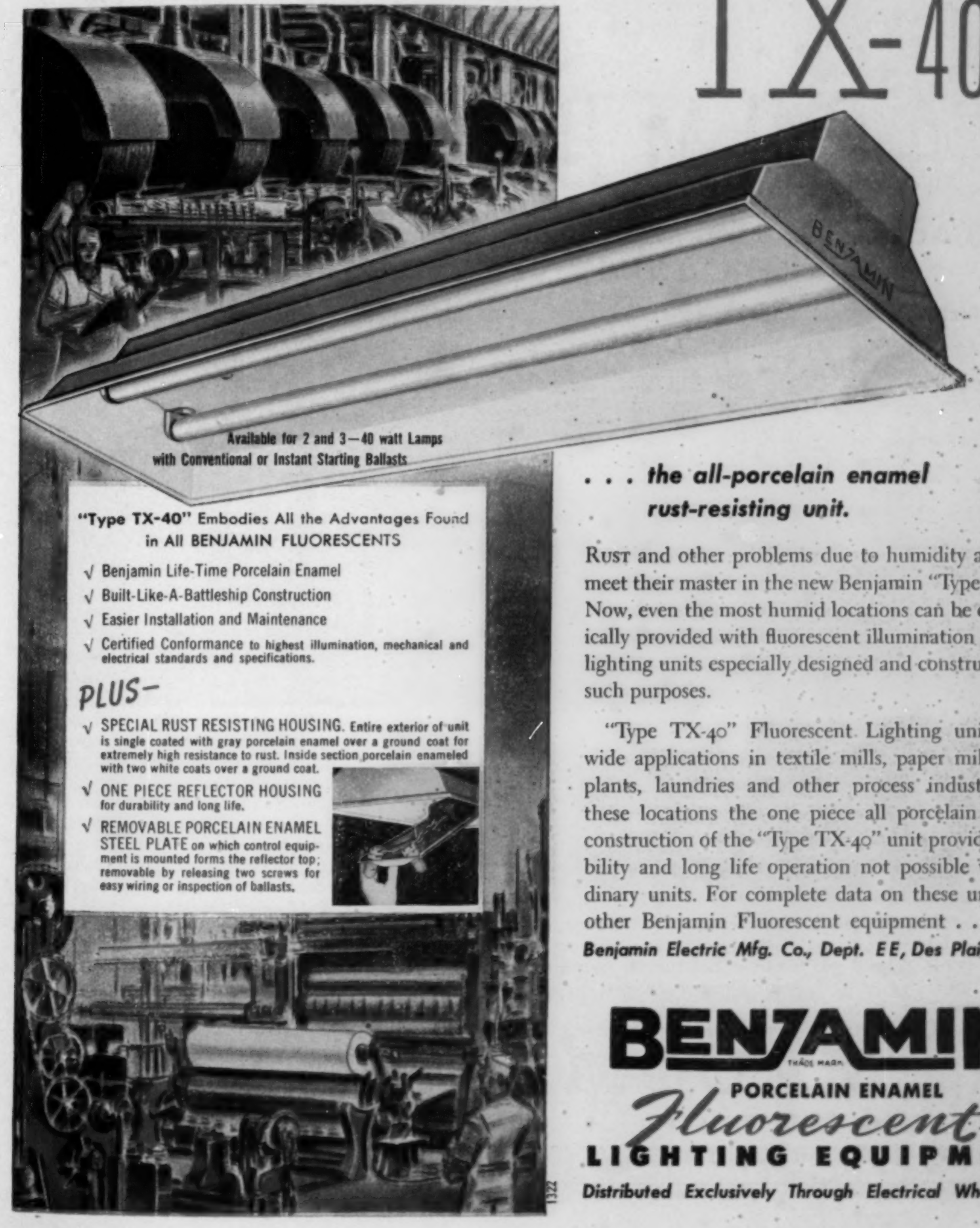
TECHNICAL DATA
IDEAS – ADVICE
INFORMATION
CONSULT YOUR FOOD SERVICE EQUIPMENT DEALER
HE IS AN EXPERT ADVISOR AND COUNSEL

The small kitchen with deversified menu finds the combination baking and roasting oven such as the NO. 959 BLODGETT UNIT used in this layout, particularly adaptable to its needs. This oven has two separately controlled sections, one with two baking compartments and one with a 12" high roasting compartment. For details and specifications of BLODGETT OVENS consult your equipment house or write

The G. S. BLODGETT CO., Inc.
50 Lakeside Avenue Burlington, Vermont

Reprints of this new series will soon be available to architects on request.

Humid, Damp and Dusty Locations call for this new one-piece Fluorescent Lighting Unit .... the new "TX-40"



Available for 2 and 3—40 watt Lamps
with Conventional or Instant Starting Ballasts

"Type TX-40" Embodies All the Advantages Found in All **BENJAMIN FLUORESCENTS**

- √ Benjamin Life-Time Porcelain Enamel
- √ Built-Like-A-Battleship Construction
- √ Easier Installation and Maintenance
- √ Certified Conformance to highest illumination, mechanical and electrical standards and specifications.

PLUS—

- √ **SPECIAL RUST RESISTING HOUSING.** Entire exterior of unit is single coated with gray porcelain enamel over a ground coat for extremely high resistance to rust. Inside section porcelain enameled with two white coats over a ground coat.
- √ **ONE PIECE REFLECTOR HOUSING** for durability and long life.
- √ **REMOVABLE PORCELAIN ENAMEL STEEL PLATE** on which control equipment is mounted forms the reflector top; removable by releasing two screws for easy wiring or inspection of ballasts.

1322

. . . the all-porcelain enamel rust-resisting unit.

RUST and other problems due to humidity and dust meet their master in the new Benjamin "Type TX-40." Now, even the most humid locations can be economically provided with fluorescent illumination through lighting units especially designed and constructed for such purposes.

"Type TX-40" Fluorescent Lighting units have wide applications in textile mills, paper mills, food plants, laundries and other process industries. In these locations the one piece all porcelain enamel construction of the "Type TX-40" unit provides durability and long life operation not possible with ordinary units. For complete data on these units and other Benjamin Fluorescent equipment . . . ***write Benjamin Electric Mfg. Co., Dept. EE, Des Plaines, Ill.***

BENJAMIN
TRADE MARK
PORCELAIN ENAMEL
Fluorescent
LIGHTING EQUIPMENT
Distributed Exclusively Through Electrical Wholesalers

FOR BETTER BUILDING

(Continued from page 102)

terials and equipment of coordinated sizes and dimensions will be made available to construction operations, and building plans and details can be correlated with such dimensions.

The new standard is A62.1-1945, American Standard Basis for the Coordination of Dimensions of Building Materials and Equipment. Also approved is A62.2-1945, American Standard Basis for the Coordination of Masonry.

Project A62 was organized by the A.S.A. in 1939, with The American Institute of Architects and The Producers' Council, Inc., as joint sponsors.

Residential Boilers

A code for rating and testing oil-fired residential steel boilers and for rating commercial boilers has been issued by Steel Boiler Institute, Inc., requiring oil-fired residential boilers up to 3,000 sq. ft. net rating to show at least 70 per cent over-all efficiency by evaporation test when operating at 150 per cent of net rating.

Even though test results are attained better than the prescribed minimum requirements, net ratings in sq. ft. of steam shall be limited to 17 times the sq. ft. of heating surface in a mechanically-fired residential boiler. A.S.M.E. Boiler Code construction is required.

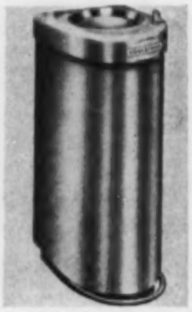
Clay Sewer Pipe

Printed copies of Simplified Practice Recommendation R211-45, Clay Sewer Pipe and Fittings, are now available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., for 10 cents each.

The recommendation lists the variety of standard-strength and extra-strength pipe and fittings to be considered as stock items.

Stock Fir Doors

Commercial Standard for Old Growth Douglas Fir Standard Stock Doors (Third Edition), CS73-45, is now a recorded standard of the industry, effective for new production from Sept. 20, 1945.



A streamlined electric water cooler of stainless steel

WATER COOLER

Pressure bubbler and bottle-type electric water coolers just announced are powered by Kelvinator and built with one-piece stainless steel cabinets and one-piece stainless steel tops. They are removable without tools, can be operated by foot pedal from sides or front. Said to be the first water cooler to provide sanitary protection against water from the mouth returning to the jet, and the first bottle-type cooler with a fully enclosed and refrigerated bottle. The Coolstream Corp., 55 W. 42nd St., New York 18, N. Y.

HOME PLANNING MODEL KIT

As an aid to home planning, the *Plan-A-Home Model Kit* offers a simple method of building a scale model of a four- to eight-room house, complete with furniture in place. All that is necessary is to lay the footings and insert the precut wall sections. Changes in the plan may be made easily by moving the footings. Plan-A-Home Model Co., Elkhart, Ind.

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Attractive and Long Wearing

Years of service have not lessened the attractive "spick and span" appearance of the stainless steel steam tables and other equipment in this hospital staff kitchen.

Constant use has demonstrated that stainless steel not only appears clean, but is easily kept clean. The smooth, hard surface of stainless steel is resistant to rust and corrosion, and does not easily dent or scratch.

Other uses of stainless steel are described in ELECTROMET REVIEW, published by ELECTRO METALLURGICAL COMPANY, a Unit of UNION CARBIDE AND CARBON CORPORATION. ELECTROMET does not make steel, but produces the ferro-alloys used in its manufacture. If you need this complimentary publication, write to ELECTRO METALLURGICAL COMPANY, 30 East 42nd Street, New York 17, N. Y.

Electromet Review

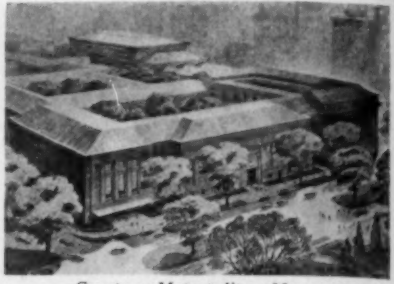
garding the positions, may be secured at any first- or second-class post office or direct from the U. S. Civil Service Commission, Washington 25, D. C.

BUILDING PLANS ARE ANNOUNCED

Museum Expansion

New York City's Metropolitan Museum of Art will be greatly enlarged and thoroughly modernized under the $10,240,000 Diamond Jubilee building program recently announced.

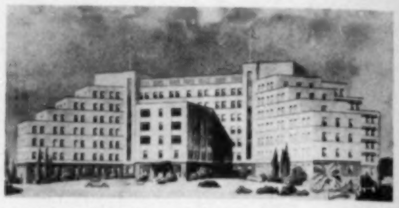
Projected in connection with the museum's 75th anniversary in February, 1947, the reconstruction and expansion program consolidates the proposed new building of the Whitney Museum of American Art as part of an organic whole of five-museums-in-one.



Courtesy Metropolitan Museum of Art

Tomorrow's Metropolitan Museum of Art

The five separate wings of the remodeled museum will house respectively (1) Ancient Art, (2) Oriental Art, (3) American Art, (4) Decorative Arts, and (5) the Picture Gallery. Architects are Robert B. O'Connor and Aymar Embury II. The new Whitney Wing will be built and endowed under terms of a bequest by Mrs. Harry Payne Whitney; Noel & Miller are the architects.



New Medical Center Planned for Beirut

Beirut Medical Center

Plans for the construction of a Medical Center at the American University of Beirut, Lebanon, at an estimated cost of $2,500,000, have been announced by Albert W. Staub, American Director of the Near East College Association, Inc.

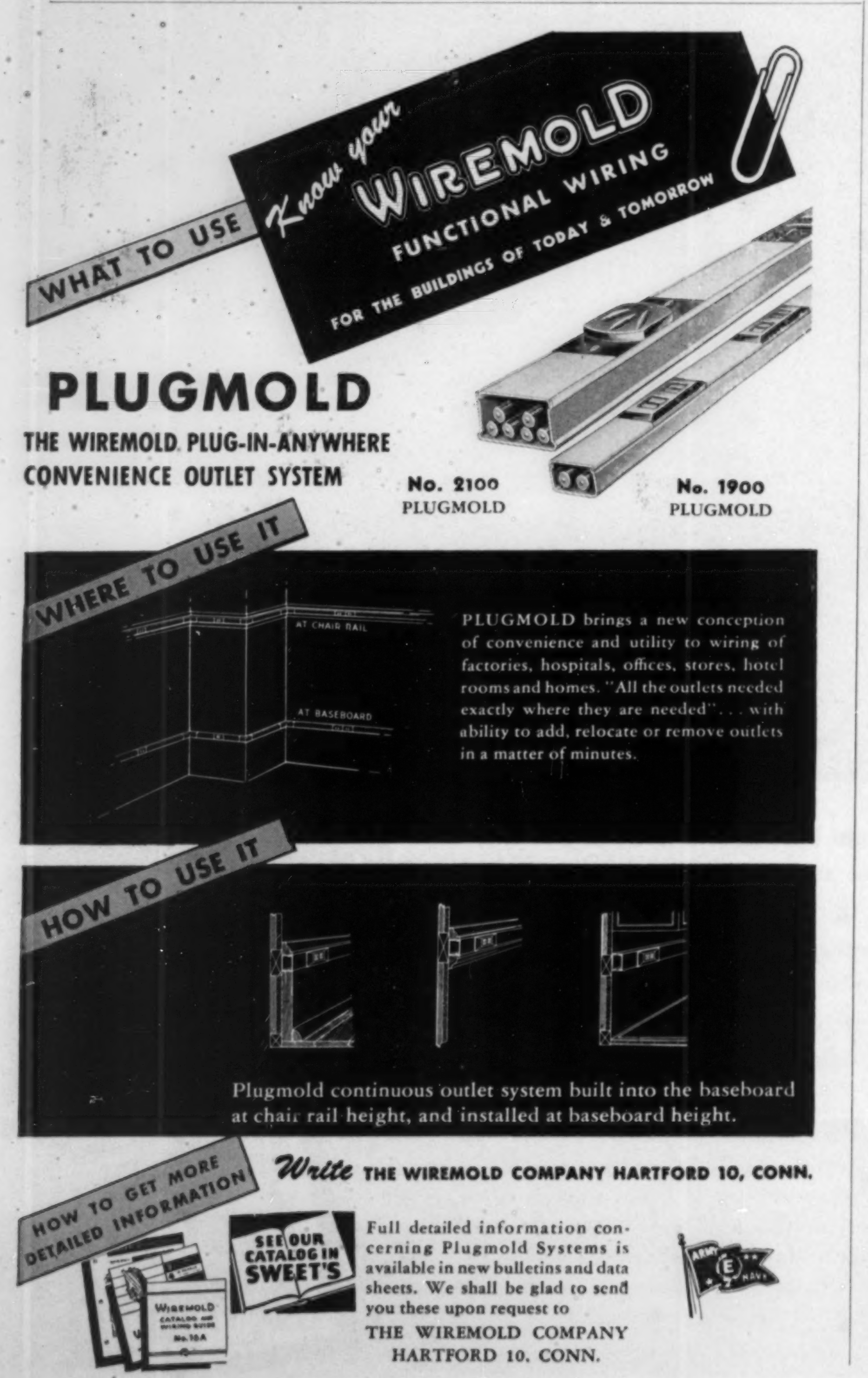
The new Center will increase the bed capacity of the present hospital by more than 250 per cent, make possible the training of 25 per cent more medical students, and treble the size of the Nursing School. It will also provide accommodations for guest research fellows in tropical medicine. W. Stuart Thompson, of New York, is the architect.

The building is designed with four main wings and two cross wings, will have a reinforced concrete frame with concrete blocks and curtain walls covered with cement stucco. An unusual feature is the outdoor waiting room provision—a loggia in the front of the hospital, and a visitors' garden in the rear.

Navy Research Center

The Charles H. Tompkins Co. of Washington has begun preliminary work in preparation for the construction of the main buildings of the Naval Ordnance Laboratory's new research center at White Oak, Md. The contract, totaling $4,813,000, was awarded the Tompkins Company for

(Continued on page 108)



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48 year old COPPER ROOF still in excellent condition...

THE COPPER ROOF on this beautiful court house at Dedham, Massachusetts was installed about 1898 . . . with copper supplied by The American Brass Company. A recent examination of the roof disclosed that the copper is in excellent condition. Records of maintenance are available only for the past 18 years, during which time no trouble has been experienced whatsoever.

For long-lasting roofs that increase in beauty with the passing years, consider the many advantages of copper.

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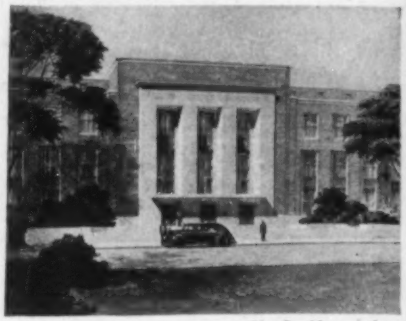
(Continued from page 106)

construction of a group of structures which will include the administration building, the photographic laboratory, spherical field laboratory, long field laboratory, officers' quarters, Marine barracks, and a portion of the roads which will connect the numerous units in the 938-acre area.

Fifty permanent buildings are planned for the new center, which the Naval Ordnance Laboratory will use for the peacetime continuance of scientific experiments in connection with under-water ordnance. More than a dozen of the smaller buildings already have been completed, and a $300,000 boiler plant will be ready shortly. Cost of the entire project will be approximately $15,000,000.

Included in the buildings now in operation are six magnetic laboratories, located in a remote section of the White Oak property away from all local media of interference. They contain no properties which would tend to create disturbances during experiments, and are devoid of red brick, which contains iron oxide, and reinforced concrete, which requires the use of iron rods. Downspouts, radiators and nails are all of copper.


U. S. Navy photo
Naval Ordnance Laboratory, White Oak

One of these magnetic buildings, the Quiet Laboratory, has no electric lights, water pipes, or other ordinary facilities which could in any possible way interfere with the work on magnetic weapons and counter-weapons.

Architects for the new Laboratory are Eggers and Higgins, of New York City, with Taylor and Fisher, of Baltimore, associates, working in collaboration with the Navy Department's Bureau of Ordnance.

Plastics Warehouse

The projected $15,000,000 expansion in plastics production facilities of The Dow Chemical Company, Midland, Mich., is planned around a three story plastics warehouse with production wings attached on either side. The original portion of the warehouse will be 240 by 320 ft., containing approximately 5 acres of floor space. This can be extended "almost indefinitely" and at the same time any required number of production wings can be added along the sides. A double track railroad is provided through the entire length of the warehouse, and bulk materials will be gravity fed to cars from the second floor of the structure. Truck docks on each production wing adjacent to the warehouse will allow efficient movement of materials.

R.I.A. AGAIN ACTIVE

The Reunions Internationales D'Architectes has resumed its activities, with headquarters in the Grand Palais, Porte E, Cours-la-Reine, Paris, France. According to the statutes of the organization, its object is "to create and strengthen intellectual, artistic and professional bonds between architects and artists of different countries, schools, formations and tendencies." All architects are eligible for membership without distinction of nationality, age, sex

(Continued on page 110)

3 LIGHTS WIDE CASEMENT UNITS

..thanks to special Pella hinge design and rigid steel frame

Here is a line of casement units with full 28" sash openings. Heights run from 2' - 4½" up to 4' - 5¼". These attractive stock-size units are helpful in solving many problems of design and proportion.

Pella special design hinges provide an extra long 5½" plate for screwing into the solid wood top and bottom sash rails. Butt plate is *riveted* to the welded steel inner frame of Pella casement units. Hinge extends to allow washing from inside. Tamper-proof when closed. A special mortise and tenon sash joint gives greater gluing surfaces. Joints are also steel-dowelled. Sash is made from genuine White Pine full 1¾" square and toxic-treated. Pre-war installations have demonstrated these 3-light wide Pella casements to be thoroughly practical on all counts.

PELLA 3-LIGHT WIDE SASH easily supports weight of 300 lb. man without springing sash "out-of-true."

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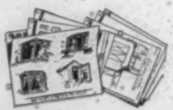

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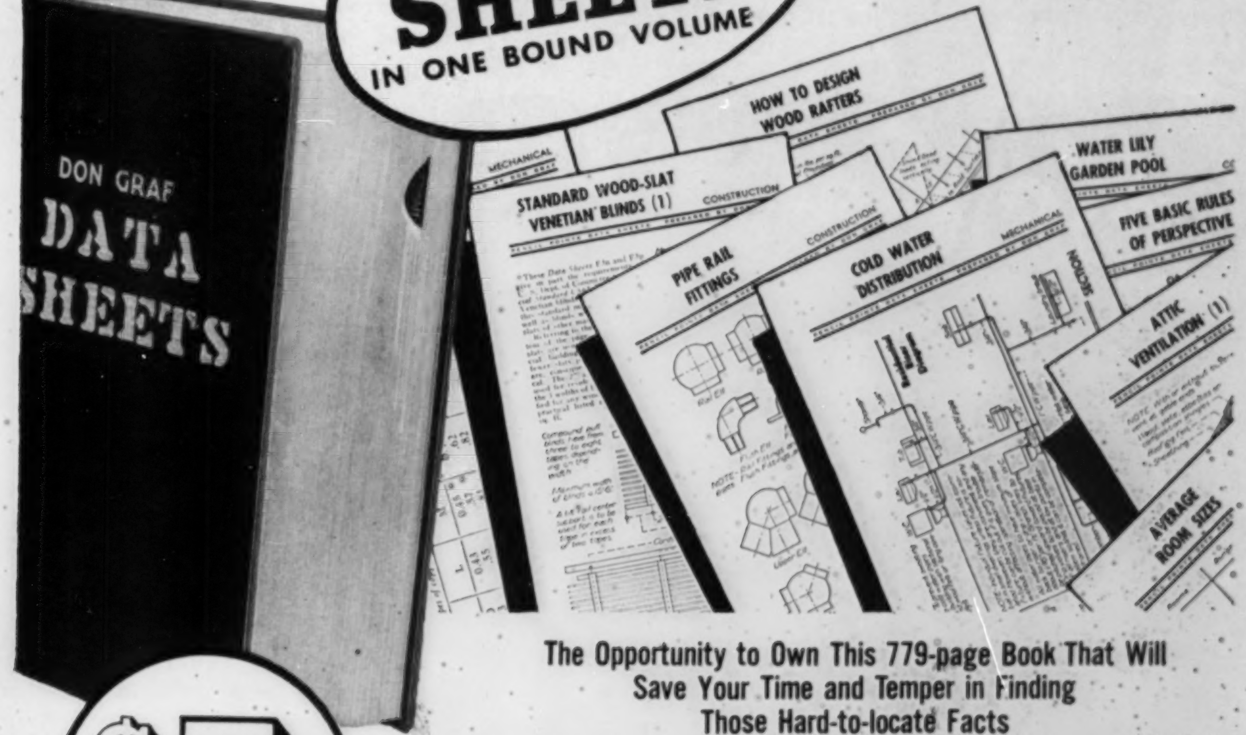

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The DATA SHEETS contain much original material available in no other architectural reference work. These pages are not just reprinted catalog drawings. The book is packed with the results of original research in quick, easy-to-use form.

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A wealth of material including valuable information on manufactured products is included within the covers of this single book, together with hundreds of sheets originally appearing in Pencil Points. Elusive facts, hard-to-remember facts, buried facts, appear on these subjects:—

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or professional formation. Activities include congresses, organized as study cruises or trips, and exchange of exhibitions, publications, documentations, students, etc.

PRODUCERS' COUNCIL MEETS

The nation's home builders are pledged to hold the line on prices of new homes as a means of preventing inflation, and have agreed to give preference to veterans wherever possible in the sale of homes so long as the acute shortage continues, Joseph E. Merrion, president of the National Association of Home Builders, told the Producers' Council at their recent three-day meeting in Cleveland.

Highlights of other addresses:

The nation's farmers are expected to spend nearly $2.5 billion for new buildings and other construction during the next six years, prophesied Chris L. Christensen, vice president of the Celotex Corp. and chairman of the Farm Buildings Committee of the Council.

The volume of new construction next year is estimated at about $7.4 billion, an increase of 60 per cent over total expenditures in 1945, said Charles E. Young, economist of the Westinghouse Electric Corp., and member of the Market Analysis Committee of the Council. Private building is expected to reach $5.2 billion, or 70 per cent of the total, according to Mr. Young.

The supply of building materials and equipment next year should be sufficient to permit the volume of new construction to exceed $7 billion provided production is not unduly delayed by wage and pricing problems, said James W. Follin, managing director of the Council.

Close cooperation between architects and building product manufacturers, as a means of speeding up the acceptance and use of new materials and equipment and of reducing construction costs, was proposed by James R. Edmunds, Jr., president of The American Institute of Architects.

MEETINGS ARE SCHEDULED

Plastics Show

Featured by a display of products by those engaged in that phase of the plastics industry, and by special program provisions whereby specific groups will have opportunities to confer on subjects of particular interest to them, the Low Pressure Industries Division of The Society of the Plastics Industry, Inc., will hold a two-day meeting at the Edgewater Beach Hotel in Chicago on February 1 and 2. The meeting will be staged under the general chairmanship of J. E. Stokes of the Bakelite Corp., and Robert J. Brinkema of Egmont Arens heads the committee handling display arrangements.

I.E.S. Convention

The Illuminating Engineering Society will hold its 1946 National Convention in Quebec, Canada. The meeting is scheduled for Wednesday through Saturday, Sept. 18-21, 1946, at the Chateau Frontenac, Quebec.

PLANNING FOR WAR MEMORIALS

The Music Council of America has prepared a brochure on band shells, music halls, school music buildings and other music facilities suitable for dedication as war memorials. The eight-page booklet, containing sketches and plans, may be obtained gratis from the Music War Council of America, Fine Arts Bldg., 410 S. Michigan Ave., Chicago 5, Ill.

(Continued on page 112)

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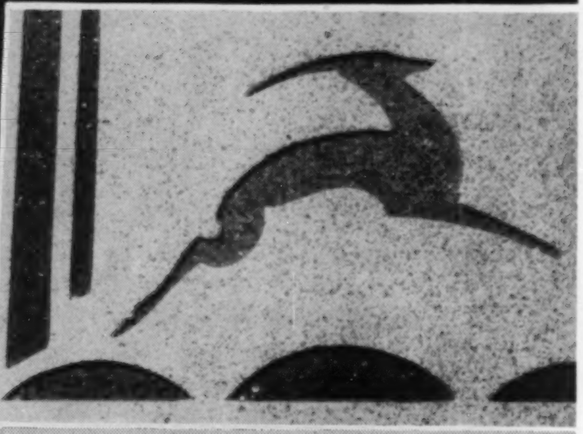

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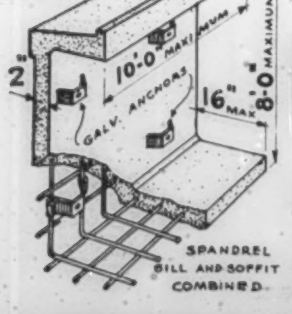

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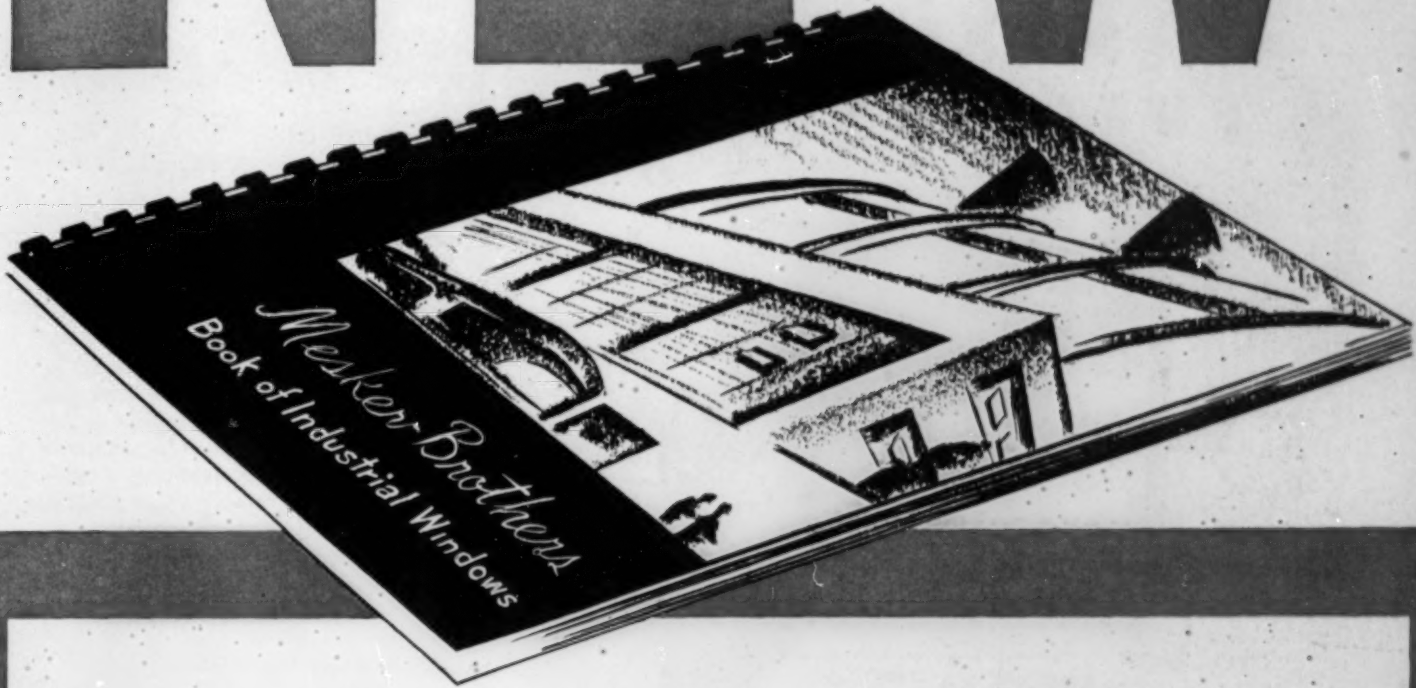

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THE RECORD REPORTS *(Continued from page 110)*

CONSTRUCTION GAINS

Substantial gains in construction contracts in October, probably attributable in part to the removal of all federal restrictions on building on October 15, were reported for the 37 states east of the Rocky Mountains by F. W. Dodge Corp. The total of all contracts awarded during the month was $316,571,000 a gain of 13 per cent over September and 118 per cent over October of last year.

During the period October 16-31, immediately following removal of WPB Limitation Order 41, contracts totaled $175,771,000 compared with $71,556,000 in the corresponding period of 1944. For this comparative period nonresidential construction in 1945 was up 216 per cent, residential building gained 172 per cent, and heavy engineering construction comprised of public works and utilities, increased 36 per cent.

The construction volume for the first 10 months of the year aggregated $2,598,531,000 compared with $1,640,685,000 in the same period of 1944. Construction for private accounts, as differentiated from publicly owned construction, represented 54 per cent of the total, as against 26 per cent in 1944. Residential construction amounted to $388,950,000, a gain of 22 per cent over 1944. Nonresidential building amounted to $1,449,185,000, an increase of 104 per cent.

HOME BUILDERS' SCHEDULE EXPOSITION

Many developments resulting from the wartime research of building and home appliance engineers are expected to be presented at the National Association of Home Builders Convention and Exposition at the Stevens Hotel in Chicago, February 25-28. The exposition will not be open to the general public.

MUSEUM TO GIVE DESIGN AWARDS

Beginning this year, annual awards will be made by the Museum of Modern Art, New York City, to the three outstanding designs of the year in mass-produced objects of everyday use. The awards will not be limited to any specific field, and may be conferred upon a tractor or a toothbrush, a canoe or an ashtray, a desk or a fountain pen, or any other useful object.

The annual awards are to be part of a three-way program initiated by the Museum's Department of Industrial Design to stimulate the creation of better design in manufactured articles. The program also includes an annual publication which will catalog currently available consumer goods recommended for their design excellence. The first issue of the catalog will be published in the early autumn of this year, at which time the awards will be made and the winning designs placed on exhibition at the museum.

PLANS ANNOUNCED FOR WHOLE NEW CITY

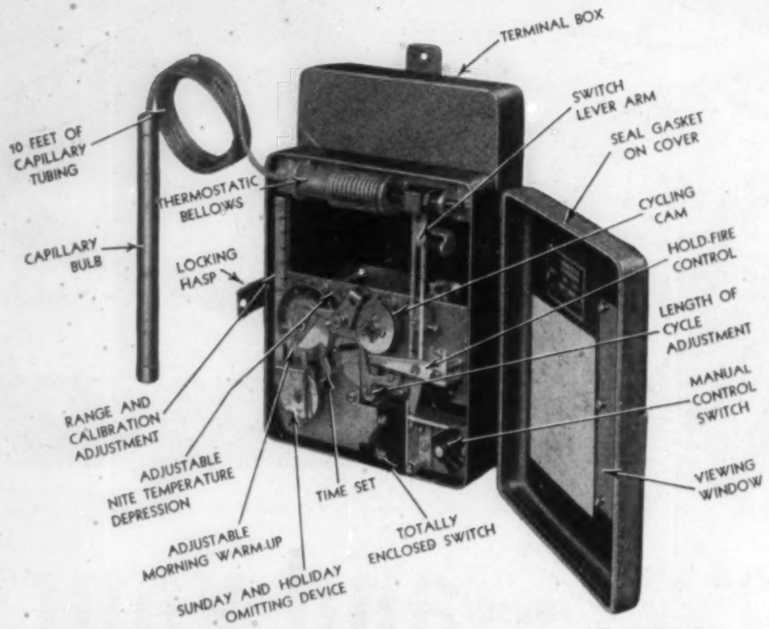
Plans for the development of a new city of a million population have been announced by William A. Krueger, Milwaukee lithographer and printer.

The proposed city, to be named "America," is to be entirely new, from the foundations up; it will be designed and planned under Mr. Krueger's direction, and will be located "in the heart of the United States."

A model of the project will be constructed and placed on exhibition in Chicago, Mr. Krueger has announced. Meanwhile offices have been opened at 616 S. Michigan Ave., Chicago.

(Continued on page 114)

MAXIMUM FUEL SAVINGS



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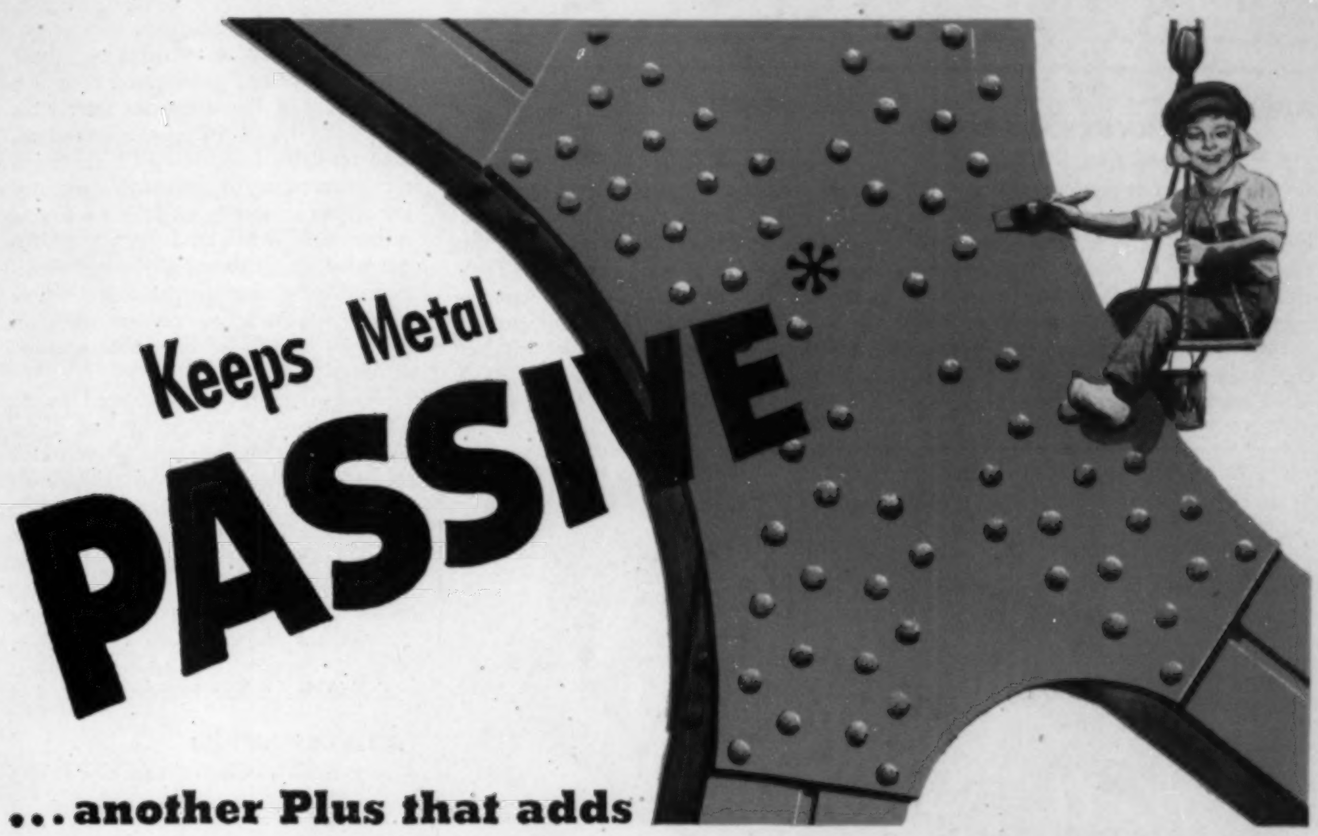


...another Plus that adds to RED LEAD'S Extra Rust Protection...

There is no question about Red Lead's acceptance throughout industry as the standard priming paint for *making metal LAST*.

One important reason is its ability to keep metal surfaces in a "passive" or rust-inhibiting state. Authorities agree that metal protective paint should be rust-inhibitive to give satisfactory performance.

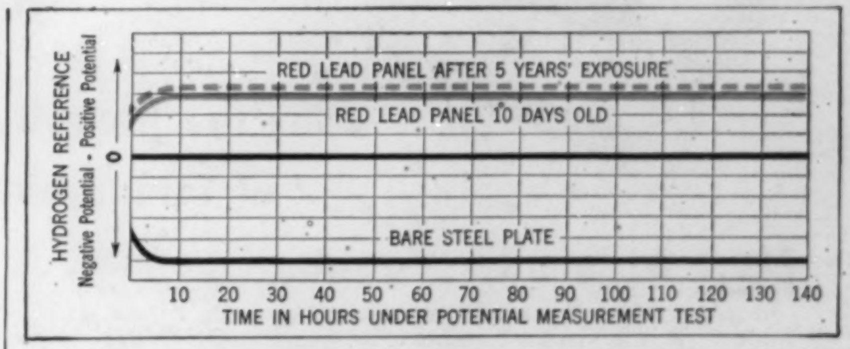
Time-potential curves, such as the one at right, are used to express rust-inhibitive properties of paint and thus indicate its effectiveness of protection. They show the effect of Red Lead on the potential of steel in the presence of moisture or water.

For example, a steel panel whose potential is *positive*, relative to hydrogen, is considered to be in a passive or non-corroding state. A negative potential indicates corrosion activity or rusting. The graph shows clearly the rust-inhibitive effect of Red Lead paint on steel as contrasted with the rapid and continuous rusting of unpainted steel.

Note that in this test a Red Lead paint film which had weathered 5 years was just as effective in preventing rust as one which had dried for only 10 days.

Specify RED LEAD for All Metal Protective Paints

The value of Red Lead as a rust preventive is most fully realized in a paint where it is the only pigment used. However, its rust-resistant properties are so pronounced that it also improves any multiple pigment paint. No matter what price you pay, you'll get a better metal paint if it contains Red Lead.



*Proof That Red Lead Keeps Metal Passive

In the above test a piece of unpainted steel was immersed in water. Iron, going into solution, reacted with oxygen in the water to form rust. This unrestrained corroding state is indicated by a rapidly developed and maintained negative potential (see above graph). However, when steel panels painted with Red Lead were immersed under the same conditions, ferric and lead salts formed directly next to the metal. This action at once stifled corrosion by preventing the iron from going into solution, thus keeping the steel surface passive. The result is shown in the graph curves above, where a quickly rising positive potential remains constant throughout the test.

Write for New Booklet—*"Red Lead in Corrosion Resistant Paints"* is an up-to-date, authoritative guide for those responsible for specifying and formulating paint for structural iron and steel. It describes in detail the scientific reasons why Red Lead gives superior protection. It also includes typical specification formulas ...ranging from Red Lead–Linseed Oil paints to Red Lead–Mixed Pigment–Varnish types. If you haven't received your copy, address nearest branch listed at right.

All types of metal-protective paints are constantly being tested under all conditions at National Lead's many proving grounds. The benefit of our extensive experience with Red Lead paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6, Buffalo 3, Chicago 80, Cincinnati 3, Cleveland 13, St. Louis 1, San Francisco 10, Boston 6 (National-Boston Lead Co.); Pittsburgh 30 (National Lead & Oil Co. of Penna.); Philadelphia 7 (John T. Lewis & Bros. Co.); Charleston 25, W. Va. (Evans Lead Division).

DUTCH BOY RED LEAD

THE RECORD REPORTS

(Continued from page 112)

NEW YORK SURVEYS ITS NEEDS

Approximately 1,700,000 people live in the 26 square miles of the New York region classified as slums or blighted districts in a survey just completed by the Regional Plan Association, Inc. These 26 square miles represent 8 per cent of the developed residential districts of the central part of the region including New York City, Westchester County in New York, and Essex, Hudson, Passaic, Union and Bergen Counties in New Jersey.

The survey, first part of a study of postwar housing potentials in the New York area, is the first block-by-block analysis that has been made of the whole central part of the New York region. It was made for the Association by Dr. Homer Hoyt, Director of Economic Studies, under supervision of the Economic Committee, of which Thomas S. Holden, president of F. W. Dodge Corp., is chairman.

For the purpose of mapping, those areas are defined as blighted in which a majority of the structures were built before 1900 and are also substandard. The residential sections with the highest proportion of blighted dwellings are in Manhattan where the 4.6 square miles of blighted land constitute 38.6 per cent of all the predominately residential area, and in Brooklyn where the 8.4 square miles of slums represent 17.9 per cent of all the home areas in that borough.

A second survey conducted by C. Earl Morrow, planning director, under the supervision of the Association's Regional Committee of which Harold S. Osborne, chief engineer of the N. Y. Telephone Co., is chairman, indicates that about 1,500 square miles of the commuter area of the New York-New Jersey-Connecticut metropolitan region is not yet in urban development or other permanent uses and is physically suitable for urban expansion.

A.I.A. CHAPTER WILL SELL STOCK PLANS

Seeking a solution to the problem of the lower-income bracket public desiring an architecturally designed house, the Washington State Chapter of the A.I.A. and the Seattle Master Builders have formed a Stock Plan Selling Bureau. Architects are invited to submit to this organization plans which, when approved, will be displayed for the public's selection. Anyone may purchase from the Bureau a complete set of plans, including six sets of blueprints and specifications, cost estimate and materials list, for $50, half of which will be paid to the architect. A charge of $50 will be made for every home constructed from the plan.

LIGHTING HANDBOOK PLANNED

Plans for publication of a lighting handbook have been announced by the Illuminating Engineering Society. Five hundred pages of text will cover every phase of lighting from the pure physics of light to specific lighting recommendations for stores, offices, homes, factories, and even for juke boxes and television studios. Publication is scheduled for October, 1946.

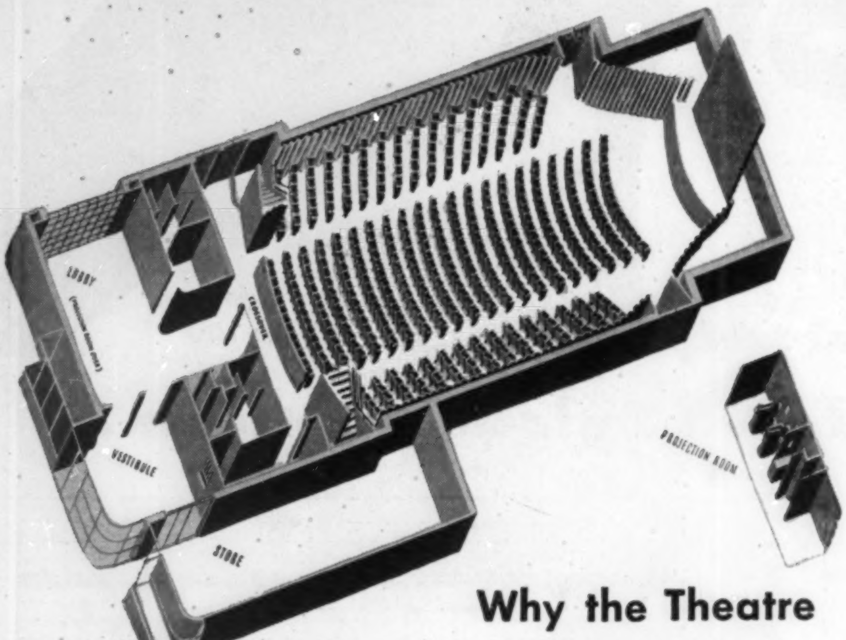
OFFICE NOTES

Offices Opened, Reopened

Nairne W. Fisher, Architect, has opened offices at 111 W. Washington St., Chicago 2, Ill., following several years in the Army and with the FPHA. He will specialize in educational, hospital and ecclesiastical architecture.

George A. Fugel, Architect, has re-

(Continued on page 116)



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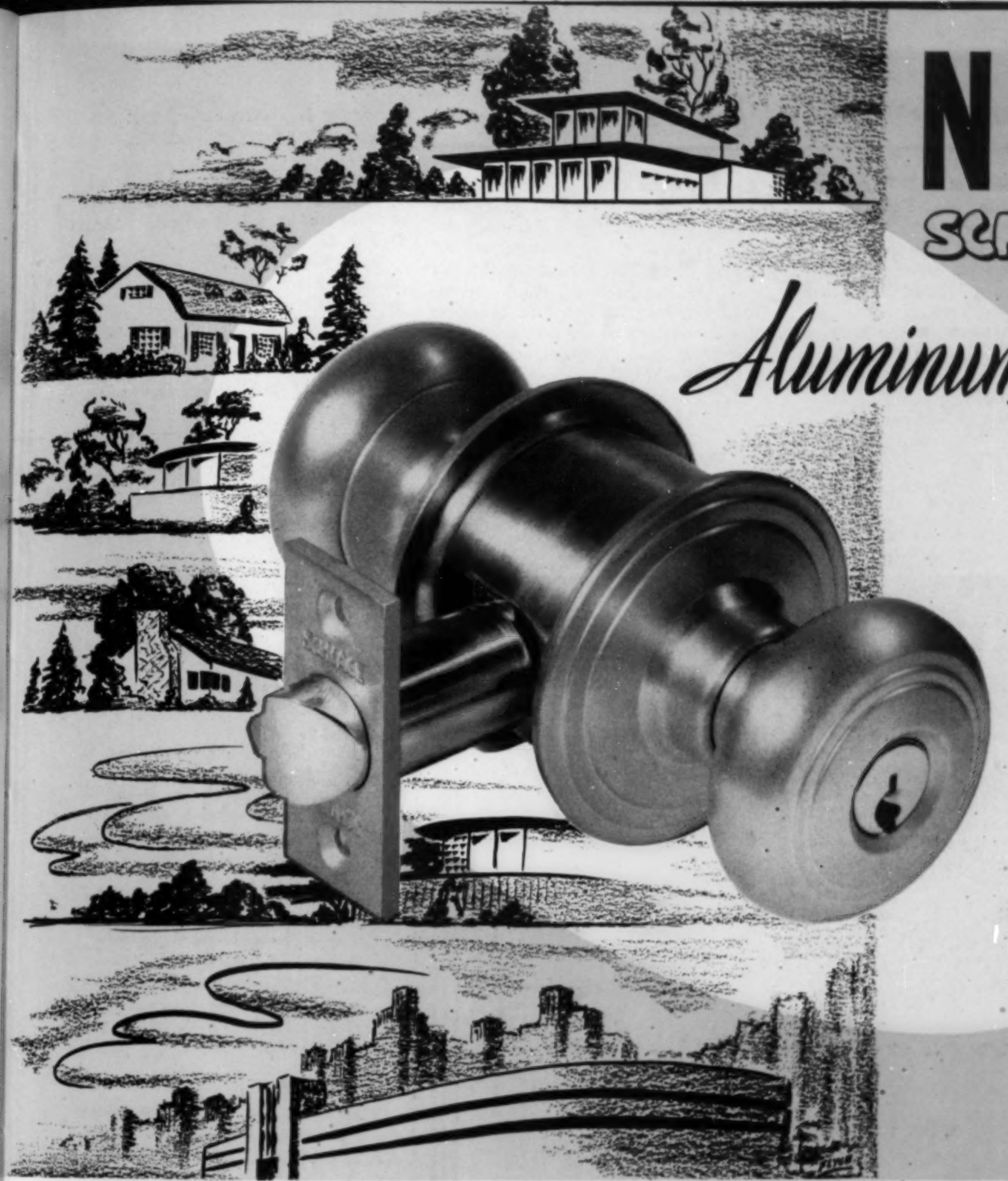

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Schlage's new process of electrolytic hardening now permits the use of *aluminum locks* to conform with aluminum interior and exterior trim. Luster Sealed Aluminum locks are highly resistant to abrasion* and non-tarnishing under all normal usage. Schlage dealers and representatives will welcome your inspection of the new Luster Sealed lock—on display now.

*Attained by Alcoa's Alumilite process, now used for aluminum pistons, streetcar handrails, cafeteria trays

SCHLAGE
LOCK COMPANY
SAN FRANCISCO NEW YORK

THE RECORD REPORTS

(Continued from page 114)

opened his office at 4319 Washington Blvd., St. Louis, Mo., following four years of government work.

Joseph W. Hart announced the reopening of his office for the practice of architecture at 510-511 Cotton States Bldg., Nashville, Tenn.

Albert L. Haskins, Jr., A.I.A., formerly associated with Williams, Coile & Pipino, Architects and Engineers, announces the opening of offices for the general practice of architecture at 806 Security Bank Bldg., Raleigh, N. C.

Van William Knox, Jr., A.I.A., announces the opening of his office for the practice of architecture at 905 Sweet Bldg., Fort Lauderdale, Fla.

F. W. Langhenrich, A.I.A., Industrial Engineer, has reopened his offices for the practice of architecture and engineering for industrial, commercial and institutional buildings. Address, 4541 W. Washington Blvd., Chicago 24, Ill.

Marvin J. Neivert, Architect, has opened new offices at 17 E. 42nd St., New York 17, N. Y.

Harry M. Newman, A.I.A., has opened an office for the practice of architecture at 728 Lafayette Bldg., Detroit 26, Mich.

W. F. Ruck, A.I.A., has reopened his offices at 940 S. Figueroa St., Los Angeles 15, Calif.

Arthur O. A. Schmidt and Associates, Architects, Store Planners and Designers, announce the establishment of offices at 641 Buhl Bldg., Detroit 26, Mich.

A. Carl Stelling, Landscape Architect and Site Planner, recently with Civil Engineer Corps, U. S. Navy, has reopened his office at 77 Park Ave., New York 16, N. Y.

Herman Wolff, R.A., has resumed his architectural practice, with offices at 44 Court St., Brooklyn 2, N. Y.

New Addresses

The following new addresses have been announced:

Citizens' Housing Council of New York, Inc., 20 W. 40th St., New York 18, N. Y.

Manoug Exerjian, Architect, 140 S. Middle Neck Rd., Great Neck, N. Y.

The H. K. Ferguson Co., industrial plant designers, engineers and builders (both sales and engineering and construction offices), 119 W. 57 St., New York, N. Y.

Miller & Voinovich, Architects (John E. Miller, A.I.A., and George S. Voinovich, A.I.A.), 1011 Swetland Bldg., Euclid Ave., Cleveland, Ohio.

Weidner and Co., Architects (Chas. T. Weidner and Max C. Friedrich), 609-610-611 Alamo Natl. Bldg., San Antonio, Texas.

Firm Changes

Vito P. Battista, A.I.A., has joined the organization of Henry V. Murphy, A.I.A., Architect, 1 Hanson Pl., Brooklyn, N. Y. Mr. Battista, for the past seven years a member of the Bureau of Architecture, Department of Public Works, City of New York, is also an architectural design critic at the New York Structural Institute and a member of the architectural faculty of Pratt Institute.

Frank F. Drolshagen, Architect, and Vern K. Boynton, Engineer, have formed a partnership under the name of Drolshagen-Boynton & Associates, with offices at 647 W. Virginia St., Milwaukee 4, Wis.

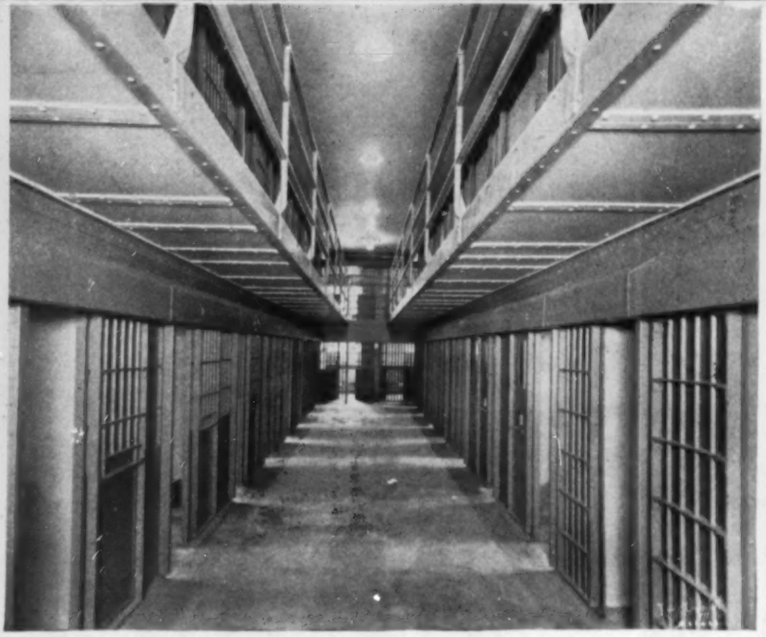
William Davies Eve and Henry Lowrey Stulb announce the formation of the firm Eve and Stulb, Architects, with offices in the Masonic Bldg., Augusta, Ga.

Donald B. Macneir, A.I.A., C. Dale

(Continued on page 118)

Stewart

JAIL AND PRISON EQUIPMENT



Our engineers will gladly give architects, builders and penal authorities the benefit of many years' experience in the jail building field. Layouts, estimates and complete information on grating and plate cells, doors, lock and locking devices, bunks, tables, seats and every accessory for new construction or the remodeling of old buildings. Stewart Non-Climbable Chain Link Wire Fence is ideal for jail yards and exercise areas. Full details sent on request.

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But even more than this, the breadth of the Crane lines permits flexibility in your planning and the wide price range enables you to specify Crane plumbing in every type of structure, from a modest cottage to an impressive town house.

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For example, the newly developed *Dial-ese* trim permits faucets to open and close at a finger's touch because water pressure has been harnessed to do the manual work of closing.

Crane plants are now producing plumbing to meet your needs, but obviously everyone cannot be supplied at once. Your Crane Branch will gladly work with you in your plans and do everything possible to help provide sanitary equipment at the time you need it.

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- Store Fronts
- Tablets
- Thresholds
- Windows

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"64 Years Young"
708 WEST FOURTH STREET
CINCINNATI 3, OHIO

(Continued from page 116)

Dykema, M.S.A., and George Zannoth, A.I.A., announce the formation of the firm of Macneir, Dykema and Zannoth, with offices at 111 E. Las Olas Blvd., Fort Lauderdale, Fla.

Frederic Arden Pawley has been appointed a design director of Norman Bel Geddes & Co., Industrial Designers, 50 Rockefeller Plaza, New York 20, N. Y. He was formerly associated with Skidmore, Owings & Merrill, Architects and Engineers.

Woodruff Harland Purnell, for 12 years a member of the architectural staff of the Tennessee Valley Authority, has resigned to become manager and member of the firm of Gill and Bianculli, Architects, Chattanooga Bank Bldg., Chattanooga, Tenn.

John W. Root announces that Joseph Z. Burgee, Chauncey Sherrick and William Holabird have been made partners, and Richard McP. Cabeen, Gilbert P. Hall, David W. Carlson and Helmuth Bartsch have been made associates in the firm of Holabird & Root, Architects, 333 N. Michigan Ave., Chicago 1, Ill.

Noah N. Sherman, Architect, and Alexander Zamshnick, Architect, announce the forming of a partnership for the general practice of architecture under the firm name of Sherman and Zamshnick, with offices at 62 William St., New York, N. Y.

Max Siegel, Engineer, and Harry F. Green, Architect, are now associated in professional practice as Siegel & Green, Architects and Engineers. Address, 1841 Broadway, New York 23, N. Y.

Ben John Small, A.I.A., formerly supervisor of hospital specifications, Bureau of Architecture, Department of Public Works, New York City, is now associated with Alfred Hopkins & Associates, Architects, 415 Lexington Ave., New York, N. Y.

Herman M. Sohn and Martny N. Weston announce the merger of their architectural practice under the firm name of Sohn & Weston, Architects. Address, 44 Court St., Brooklyn, N. Y.

AT THE COLLEGES

Larrick Returns to Ohio

Capt. Thomas Larrick, C. E., has returned to his former position as university architect and head of the department of architecture at Ohio University, Athens, Ohio.

Aalto Returns to M.I.T.

Alvar Aalto, internationally known Finnish architect, rejoined the faculty of the School of Architecture and Planning at the Massachusetts Institute of

(Continued on page 120)

"Spotlight" on Better Heating

"Spotlight" on the Webster Moderator System—the system that gives you adequate temperature on cold days; that limits the heat on mild days; that uses only the necessary amount of fuel—and that does it all automatically!

The Webster Moderator System of Steam Heating is "Controlled-by-the-Weather". An Outdoor Thermostat automatically balances the delivery rate of steam to each radiator so that it agrees with changes in outdoor temperatures.

More Heat with Less Fuel

Seven out of ten large buildings in America (many less than ten years old) can get up to 33% more heat out of the fuel consumed! . . . If you are planning on a new building or on the modernization of an existing building, you will be interested in "Performance Facts"—a book of case studies, *before* and *after* figures, on 268 Webster Steam Heating installations. Write for it today. Address Department AR-1.

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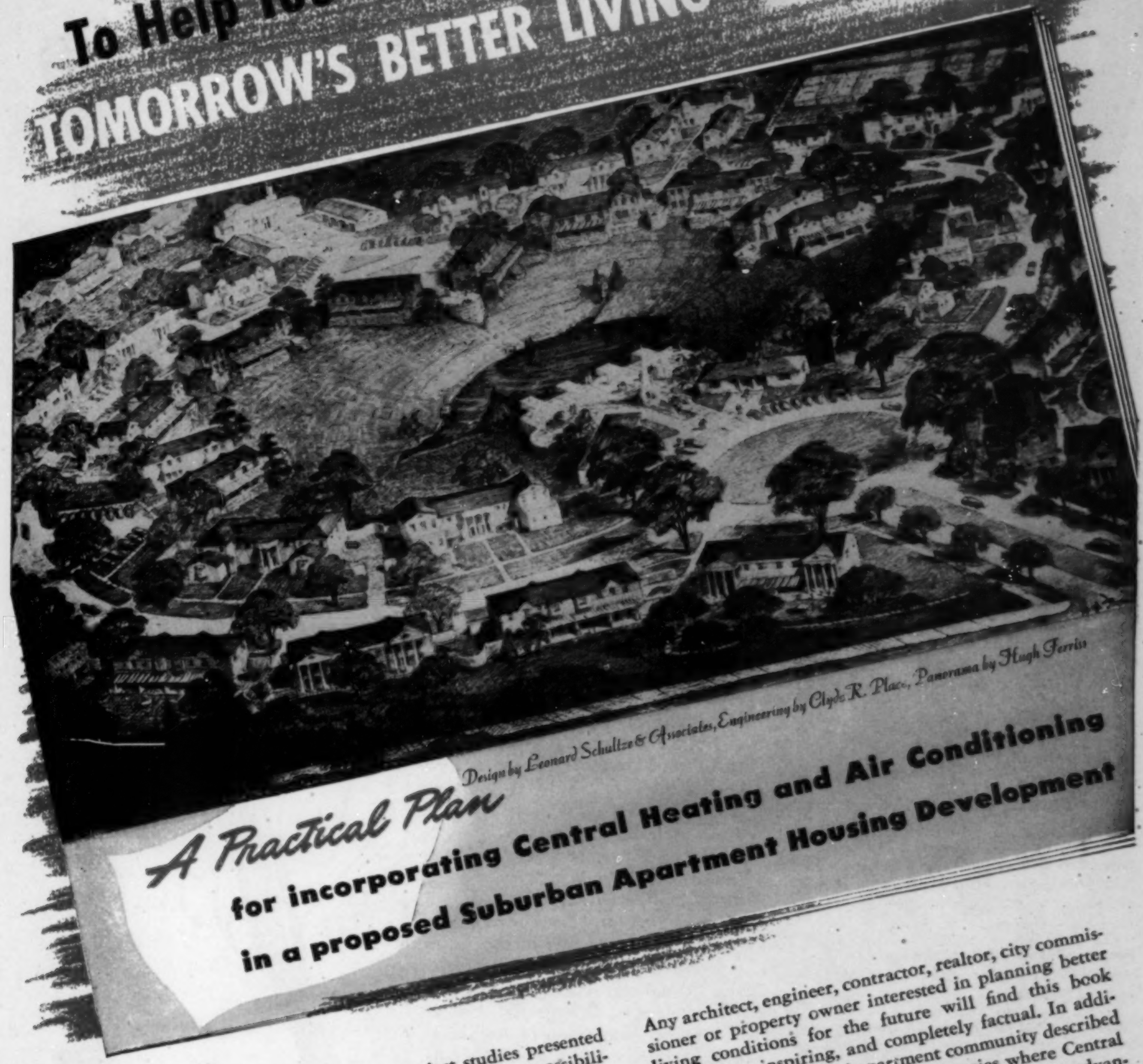

Design by Leonard Schultze & Associates, Engineering by Clyde R. Place, Panorama by Hugh Ferriss

A Practical Plan for incorporating Central Heating and Air Conditioning in a proposed Suburban Apartment Housing Development

This is the first in a series of project studies presented by the Ric-wiL Company, to demonstrate the possibilities and advantages of Central Heating. It discusses in detail—with blue prints, cost figures, etc., the practicability of heating, cooling and supplying other services from a Central Plant. Designed by Leonard Schultze and Associates. Engineering is by Clyde R. Place. The cover illustration is a four color rendering of the project by Hugh Ferriss, noted architectural artist.

Any architect, engineer, contractor, realtor, city commissioner or property owner interested in planning better living conditions for the future will find this book stimulating, inspiring, and completely factual. In addition to the hypothetical apartment community described in detail, it contains actual case histories where Central Heating has proved its many economic and other advantages. This book is our contribution to help you plan tomorrow's better living conditions.

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Send for our Book No. 110 for your A. I. A. File No. 14-K. Shows many types and uses . . . pictures prominent installations . . . contains structural diagrams and specification tables for Anchor Chain Link Fence. No obligation. Address: Anchor Post Fence Co., 6600 Eastern Avenue, Baltimore 24, Maryland.

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THE RECORD REPORTS

(Continued from page 118)

Technology for the fall term. He was a member of the staff in the fall of 1940, when he returned to Finland to direct the reconstruction program.

Heythums to Columbia

Antonin and Charlotta Heythum, formerly of the California Institute of Technology, are now in New York, conducting a design analysis course at the school of Architecture, Columbia.

Glass Technology Courses

Preparing for the early offering of a new curriculum in glass technology and engineering, Ohio State University has announced the appointment of Dr. Henry H. Blau to the position of professor of glass technology.

Dr. Blau, vice president in charge of manufacture and research for the Federal Glass Co., Columbus, Ohio, is dividing his time between the company and the university.

J. BURN HELME

Professor J. Burn Helme, a member of the department of architecture at the Pennsylvania State College since 1925, died from a stroke in Centre County Hospital on November 12. He was 48.

Professor Helme, who was in charge of the division of fine arts at Penn State, was born in Smith Falls, Ontario. He held the degrees of bachelor of applied science and master of architecture from the University of Toronto, and a master of arts degree from Harvard. He was a member of the American Institute of Architects (past president), American Association of University Professors, College Art Association, Ontario Association of Architects, Royal Architects Institute of Canada, Town Planning Institute of Canada, and many other organizations.

JOHN J. EARLEY

John J. Earley, 64, architectural sculptor, died at his home in Washington, D. C., on November 25.

A native of New York, Mr. Earley was the fourth in a line of architectural sculptors, beginning his career in his father's studio at the age of 17. Outstanding examples of his work are the interior of the Church of the Sacred Heart in Washington, and the Fountain of Time, on which he collaborated with Lorado Taft. He developed the architectural concrete and plastic mosaic process which bears his name.

(Continued on page 124)

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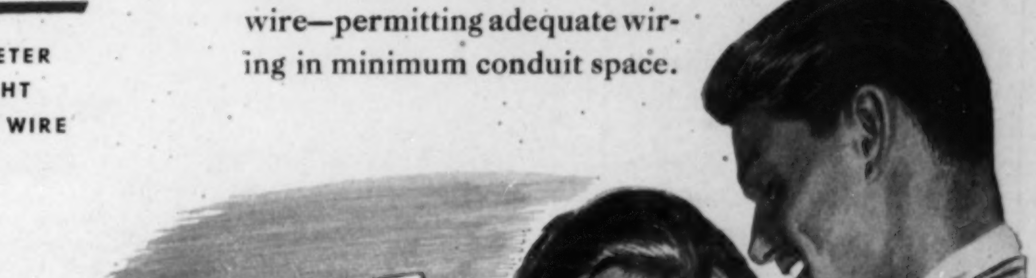

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(Continued from page 28)

ARCHITECT AND AUTHORITY

The Local Housing Authority and the Architect. By Oliver C. Winston. Chicago 37, Ill. (1313 E. 60th St.), Public Administration Service, 1945. 7 x 10 in., 60 pp. 60c.

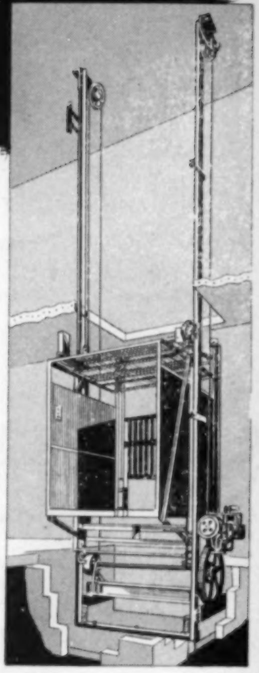
Subtitled "A Working Relationship in Planning a Public Housing Program and in Designing a Public Housing Project," this booklet stresses the importance of cooperation between the housing authority and the architect. Considerable emphasis is placed on the responsibilities of the housing authority *before* the architect starts to design—the establishment of basic requirements. Mr. Winston finds three phases in this working relationship: (1) planning the new over-all housing program; (2) preparing the architectural program; and (3) designing the project. In the first phase the main burden of the work falls logically upon the housing authority, with the architect's principal services of a consulting nature. In the second phase, too, the architect's contribution is chiefly advice—on site planning, dwelling types, community facilities; with the preparation of cost estimates and some technical assistance on the side. The third phase, of course, is almost wholly the architect's bailiwick.

"If such an approach to design . . . is adopted at the very beginning," Mr. Winston concludes, "it should be possibile to avoid the unatisfacsory practice of having to prune, whittle and shave project designs . . . Such an approach should lead to a more purposeful selection of planning criteria by the local housing authorities and to more disciplined use of design criteria by architects and engineers."

SHOPPING CENTERS

Planning Neighborhood Shopping Centers. By Marcel Villaneuva, A.I.A. New York 18 (512 Fifth Ave.), National Committee on Housing, Inc., 1945. 8½ by 11 in. 34 pp. illus. $1.00.

Here is a community planning study devoted entirely to the problems of the shopping center—its location, the number of stores required, parking spaces, and so on. Its chief value probably lies in the carefully worked out tables giving area requirements for stores of various types. While these requirements are purely theoretical, they serve as a working basis for planning, and they point up Mr. Villaneuva's conclusion that "most cities and towns are overbuilt with old and unwanted stores, and underbuilt with regard to new and desired shopping centers planned for our modern way of living."



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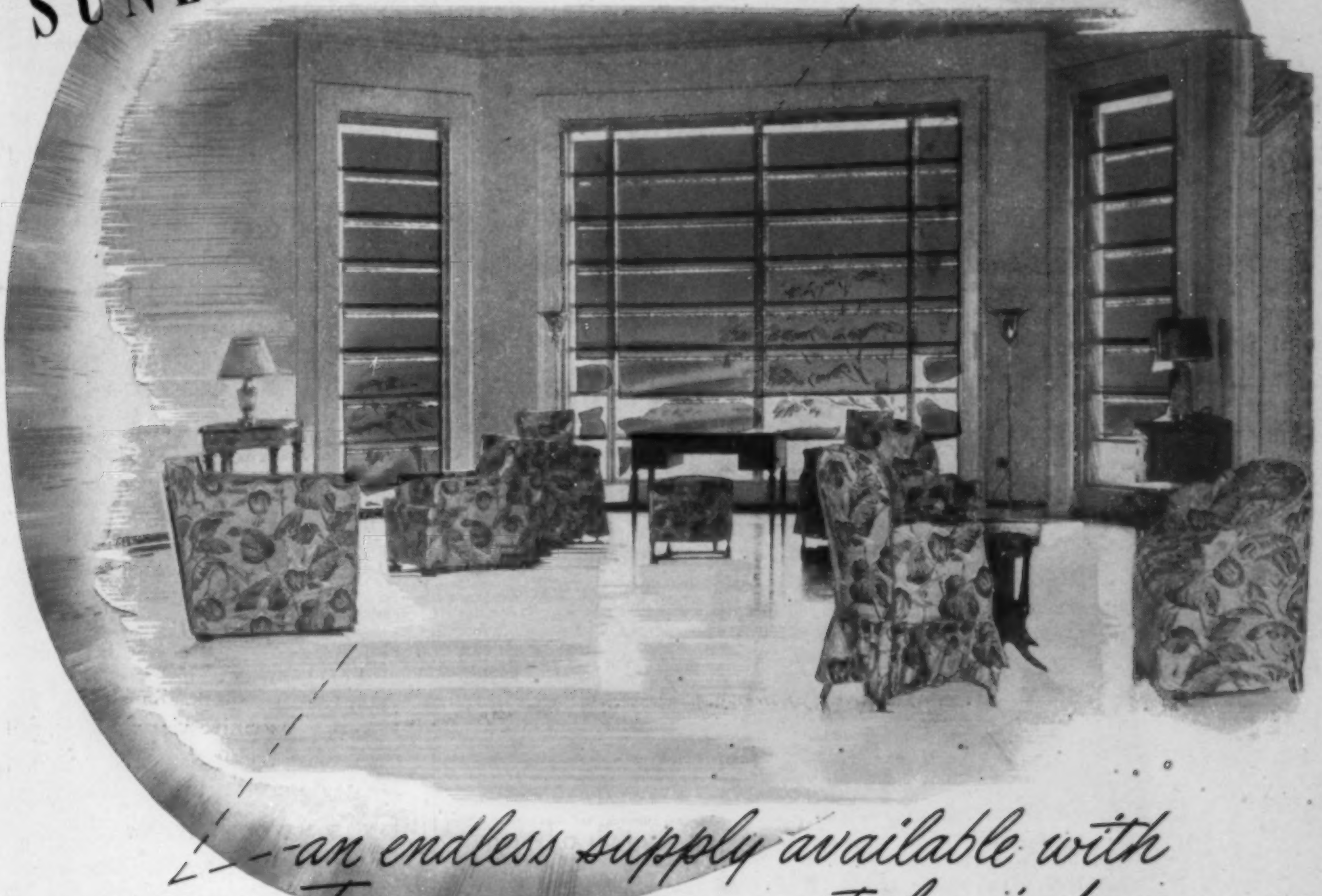

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The Maxim-Air window provides approximately 100% ventilation with the simultaneous operation of all ventilators by mechanical means. For window units in widths up to 11 ft. 8½ in., and heights up to 11 ft. 11½ in., (provided ventilator height does not exceed 16 in. and total area does not exceed 80 sq. ft.) the Maxim-Air Louver Window offers many advantages which recommend its selection.

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